A RANDOMIZED CONTROLLED TRIAL COMPARING THE EFFECT OF FORTIFICATION OF HUMAN MILK WITH AN INFANT FORMULA POWDER WITH UNFORTIFIED HUMAN MILK ON THE GROWTH OF VERY LOW BIRTH WEIGHT BABIES

DOCTORATE IN MEDICINE (NEONATOLOGY)

OF

DR. VIJAY GUPTA

DEPARTMENT OF NEONATOLOGY

CHRISTIAN MEDICAL COLLEGE

VELLORE – 632 004

Certification

This is to certify that the dissertation entitled "**A RANDOMIZED CONTROLLED TRIAL COMPARING THE EFFECT OF FORTIFICATION OF HUMAN MILK WITH AN INFANT FORMULA POWDER WITH UNFORTIFIED HUMAN MILK ON THE GROWTH OF VERY LOW BIRTH WEIGHT BABIES.**" is a bonafide work done by **VIJAY GUPTA** in the Department of Neonatology, Christian Medical College, Vellore, in partial fulfilment of the Tamil Nadu Dr. M.G.R. Medical University rules and regulations for award of Doctorate in Medicine (branch XI) Neonatology under my guidance and supervision during the academic year 2012-2015.

Dr. Niranjan Thomas
Guide
Professor & Head
Department of Neonatology
Christian Medical College
VELLORE – 632 004.

Certification

This is to certify that the dissertation entitled "**A RANDOMIZED CONTROLLED TRIAL COMPARING THE EFFECT OF FORTIFICATION OF HUMAN MILK WITH AN INFANT FORMULA POWDER WITH UNFORTIFIED HUMAN MILK ON THE GROWTH OF VERY LOW BIRTH WEIGHT BABIES."** is a bonafide work done by **VIJAY GUPTA** in the Department of Neonatology, Christian Medical College, Vellore, in partial fulfilment of the Tamil Nadu Dr. M.G.R. Medical University rules and regulations for award of Doctorate in Medicine (branch XI) Neonatology under my guidance and supervision during the academic year 2012-2015.

Dr. Niranjan Thomas
Professor & Head
Department of Neonatology
Christian Medical College
VELLORE – 632 004.

Certification

This is to certify that the dissertation entitled "**A RANDOMIZED CONTROLLED TRIAL COMPARING THE EFFECT OF FORTIFICATION OF HUMAN MILK WITH AN INFANT FORMULA POWDER WITH UNFORTIFIED HUMAN MILK ON THE GROWTH OF VERY LOW BIRTH WEIGHT BABIES."** is a bonafide work done by **VIJAY GUPTA** in the Department of Neonatology, Christian Medical College, Vellore, in partial fulfilment of the Tamil Nadu Dr. M.G.R. Medical University rules and regulations for award of Doctorate in Medicine (branch XI) Neonatology under my guidance and supervision during the academic year 2012-2015.

Dr. Alfred job Deniel
Principal
Christian Medical College
VELLORE – 632 004.

Certification

This is to certify that the dissertation entitled **"A RANDOMIZED CONTROLLED TRIAL COMPARING THE EFFECT OF FORTIFICATION OF HUMAN MILK WITH AN INFANT FORMULA POWDER WITH UNFORTIFIED HUMAN MILK ON THE GROWTH OF VERY LOW BIRTH WEIGHT BABIES."** is a bonafide work done by me in the Department of Neonatology, Christian Medical College, Vellore, in partial fulfilment of the Tamil Nadu Dr. M.G.R. Medical University rules and regulations for award of Doctorate in Medicine (branch XI) Neonatology during the academic year 2012-2015.

Dr. Vijay Gupta
SR PG Registrar (DM)
Dept. Of Neonatology
Christian Medical College
VELLORE – 632 004.

OFFICE OF RESEARCH
INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA.

Ethics Committee Registration No : ECR/216/INST/TN/2013 issued under Rule 122D of the Drugs & Cosmetics Rules 1945, Govt. Of India.

Dr. George Thomas, D Ortho., Ph.D.,
Chairperson, Ethics Committee

Dr. B. Antonisamy, M.Sc., Ph.D., FSMS, FRSS.,
Secretary, Research Committee

Prof. Keith Gomes, B.Sc., M.A (S.W), M.Phil.,
Deputy Chairperson, Ethics Committee

Dr. Alfred Job Daniel, D Ortho, MS Ortho, DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Glas) (EDIN)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

October 22, 2013

Dr. Vijay Gupta
Sr PG Registrar
Department of Neonatology
Christian Medical College,
Vellore 632 002

Sub: **Fluid Research grant project**:
A Randomized Controlled Trial comparing the effect of fortification of human milk with an infant formula powder on the growth of very low birth weight babies.
Dr. Vijay Gupta, Sr PG Registrar, Neonatology, Dr. Niranjan Thomas, Dr. Atanu Kumar Jana, Dr. Anil Kurievilla, Dr Sridhar Santhanam, Dr. Manish Kumar, Neonatology.

Ref: IRB Min. No. 8424 [INTERVEN] dated 21.08.2013

Dear Dr. Vijay Gupta,

I enclose the following documents:-

1. Institutional Review Board approval 2. Agreement

Could you please sign the agreement and send it to Dr. Nihal Thomas, Addl. Vice Principal (Research), so that the grant money can be released.

With best wishes,

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

Dr. NIHAL THOMAS
MD, MNAMS, DNB(Endo), FRACP(Endo),FRCP(Glas),FRCP(Edin)
SECRETARY - (ETHICS COMMITTEE)
Institutional Review Board,
Christian Medical College, Vellore - 632 002.

CC: Dr. Niranjan Thomas, Neonatology, CMC.

Ethics Committee Silver, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002.
Tel : 0416 - 2284294, 2284202 Fax : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

OFFICE OF RESEARCH
INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA.

Ethics Committee Registration No : ECR/326/INST/TN/2013 issued under Rule 122D of the Drugs & Cosmetics Rules 1945, Govt. Of India.

Dr. George Thomas, D Ortho., Ph.D.,
Chairperson, Ethics Committee

Dr. B. Antonisamy, M.Sc., Ph.D., FSMS, FRSS.,
Secretary, Research Committee

Prof. Keith Gomez, B.Sc., M.A (S.W), M.Phil.,
Deputy Chairperson, Ethics Committee

Dr. Alfred Job Daniel, D Ortho, MS Ortho, DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas,
MD., MNAMS., DNB (Endo), FRACP (Endo), FRCP (Glas) (EDIN)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

October 22, 2013

Dr. Vijay Gupta
Sr PG Registrar
Department of Neonatology
Christian Medical College,
Vellore 632 002

Sub: **Fluid Research grant project:**
A Randomized Controlled Trial comparing the effect of fortification of human milk with an infant formula powder on the growth of very low birth weight babies.
Dr. Vijay Gupta, Sr PG Registrar, Neonatology, Dr. Niranjan Thomas, Dr. Atanu Kumar Jana, Dr. Anil Kuruvilla, Dr Sridhar Santhanam, Dr. Manish Kumar, Neonatology.

Ref: IRB Min. No. 8424 [INTREVEN] dated 21.08.2013

Dear Dr. Vijay Gupta,

The Institutional Review Board (Silver, Research and Ethics Committee) of the Christian Medical College, Vellore, reviewed and discussed your project titled "A Randomized Controlled Trial comparing the effect of fortification of human milk with an infant formula powder on the growth of very low birth weight babies." on August 21, 2013.

The committee reviewed the following documents:

1. Format for application to IRB submission
2. Patient Information sheet and Informed Consent Form (English and Tamil)
3. Cvs of Drs. Vijay Gupta, Niranjan Thomas, Dr. Atanu Kumar Jana, Anil Kuruvilla, Sridhar Santhanam, Manish Kumar.
4. A CD containing documents 1 - 3

Ethics Committee Silver, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002.
Tel : 0416 - 2284294, 2284202 Fax : 0416 - 2252788, 2284481 E-mail : research@cmcvellore.ac.in

The following Institutional Review Board (Research & Ethics Committee) members were present at the meeting held on August 21, 2013 at 9.45 am in the CREST/SACN Conference Room, Christian Medical College, Bagayam, Vellore 632002.

Name	Qualification	Designation	Other Affiliations
Dr. Poonkuzhali	MSC, PhD	Professor, Haematology, CMC	Internal, Basic Medical Scientist
Dr. Binu Susan Mathew	MBBS, MD	Associate Professor, Dept. of Clinical Pharmacology	Internal, Pharmacologist
Dr. Suresh Devasahayam	BE, MS, PhD	Professor, Bioengineering, CMC	Internal, Basic Medical Scientist
Mrs. Pattabiraman	B Sc, DSSA	Social Worker, Vellore	External, Lay person
Mr. Sampath	B Sc, BL	Advocate	External, Legal Expert
Mr. Samuel Abraham	MA, PGDBA, PGDPM, M.Phil, BL	Legal Advisor, CMC.	Internal, Legal Expert
Mrs. Mary Johnson	M.Sc	Professor, Child Health Nursing, CMC.	Internal, Nurse
Dr. Asha Mary Abraham	MBBS, MD, PhD	Professor, Virology, CMC	Internal, Clinician
Mrs. Selva Titus Chacko	M Sc	Professor, Medical Surgical Nursing, CMC	Internal, Nurse
Rev. Dr. Arul Dhas	M Sc, BD, DPC, PhD(Edin)	Chaplain, CMC	Internal, Social Scientist
Prof. Keith Gomez	BSc, MA (S.W), M. Phil (Psychiatry Social Work)	Deputy Chairperson (IRB) & Students' Counsellor, Loyola College, Chennai	External, Lay Person & Social Scientist
Dr. Jayaprakash Muliyil	BSC, MBBS, MD, MPH, DrPH(Epid), DMHC	Retired Professor, Vellore	External, Clinician & Epidemiologist

Ethics Committee Silver, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002
Tel : 0416 - 2284284, 2284282 Fax : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

Dr. B. Antonisamy	M Sc, PhD, FSMS, FRSS	Professor & Head Dept. of Biostatistics & Secretary IRB (RC), CMC	Internal, Statistician
Dr. Molly Jacob	MBBS, MD, PhD	Professor, Biochemistry, CMC	Internal, Clinician
Dr. Prathap Tharyan	MD, MRC Psych.	Professor of Psychiatry, CMC	Internal, Clinician
Dr. P. Zachariah	MBBS, PhD	Retired Professor, Vellore.	External, Scientist
Dr. Nihal Thomas	MD MNAMS DNB(Endo) FRACP (Endo) FRCP(Edin) FRCP (Glasg)	Secretary IRB (EC)& Dy. Chairperson (IRB), Professor of Endocrinology & Addl. Vice Principal (Research), CMC.	Internal, Clinician

We approve the project to be conducted as presented.

The Institutional Ethics Committee expects to be informed about the progress of the project, any **adverse events** occurring in the course of the project, any **amendments in the protocol and the patient information / informed consent**. On completion of the study you are expected to submit a copy of the **final report**. Respective forms can be downloaded from the following link: http://172.16.11.136/Research/IRB_Polices.html in the CMC Intranet and in the CMC website link address: http://www.cmch-vellore.edu/static/research/Index.html.

Ethics Committee Silver, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002.
Tel : 0416 - 2284294, 2284202 Fax : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

Fluid Grant Allocation:

A sum of 80,000/- INR (Rupees Eighty Thousand only) for 2 years. [A sum of Rs 40,000/- will be released for 1 st installment subsequent installment of 40,000/- each will be released at the end of the first year following the receipt of the interim progress report.]

Yours sincerely

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

Dr. NIHAL THOMAS
SECRETARY - (ETHICS COMMITTEE)
Institutional Review Board
Christian Medical College, Vellore - 632 002.

CC: Dr. Niranjan Thomas, Neonatology, CMC

Ethics Committee Silver, Office of Research, 1st Floor, Carman Block, Christian Medical College, Vellore, Tamil Nadu 632 002.
Tel : 0416 - 2284294, 2284202 Fax : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

preferences

Originality Report

Processed on: 26-Mar-2015 15:57 IST
ID: 520930264
Word Count: 16777
Submitted: 1

Document Viewer

A RANDOMIZED CONTROLLED TRIAL COMPARING THE E...

By Vijay gupta

Similarity Index	Similarity by Source	
7%	Internet Sources:	4%
	Publications:	6%
	Student Papers:	0%

include quoted include bibliography excluding matches < 12 words mode: show highest matches together

INTRODUCTION:

Human milk is considered the best source of nutrition for preterm newborn babies, due to several nutritional and immunologic 3

advantages (1-9). Exclusive feeding with human milk

has been shown to reduce morbidity and mortality 22

related to neonatal sepsis and necrotising enterocolitis (10–15).

Postnatal growth retardation is a serious and major concern in growing preterm 33

very low birth babies, especially in low-mid income countries like India (16). Growth failure in preterm

very low birth weight (VLBW) babies has been attributed due to 21

protein deficiency rather than energy deficit (17–19). There is physiologic decline in concentration of protein, sodium, zinc and other micronutrients throughout lactation. This physiologic decline in milk concentration of protein and micronutrients precedes any

1 1% match (Internet from 07-Oct-2010)
http://indianpediatrics.net

2 < 1% match (publications)
"WORLD TRANSPLANT CONGRESS 2006 POSTER ABSTRACTS", American Journal of Transplantation, 8/2006

3 < 1% match (Internet from 23-Jun-2010)
http://abbottnutrition.com

4 < 1% match (publications)
Romagnoli, C. Zecca, E. Luciano, R. Torr. "A three year follow up of preterm infants after moderately early treatment with dexamethasone. (Orig", Archives of Disease in Childhood. Fetal , July 2002 Issue

5 < 1% match (publications)
Tergestina, Mintoo, Arun Jose, Santhanam Sridhar, Victoria Job, Grace Rebekah, Kurien Anil Kuruvilla, and Niranjan Thomas. "Vitamin D Status and Adequacy of Standard Supplementation in Preterm Neonates From South India :", Journal of Pediatric Gastroenterology and Nutrition, 2014.

Clinical Trial Details (PDF Generation Date :- Wed, 04 Mar 2015 15:11:32 GMT)

CTRI Number	CTRI/2013/11/004149 [Registered on: 19/11/2013] - Trial Registered Prospectively
Last Modified On	04/03/2015
Post Graduate Thesis	Yes
Type of Trial	Interventional
Type of Study	Nutraceutical
Study Design	Randomized, Parallel Group Trial
Public Title of Study	Comparing the growth of very low birth babies who are fed with breast milk with or without added milk powder formula
Scientific Title of Study	A randomized controlled trial comparing the effect of fortification of human milk with an infant formula powder on the growth of very low birth weight babies

Secondary IDs if Any

Secondary ID	Identifier
NIL	NIL

Details of Principal Investigator or overall Trial Coordinator (multi-center study)

Details of Principal Investigator	
Name	Vijay Gupta
Designation	Sr PG Registrar
Affiliation	CMC Hospital
Address	Department of Neonatology CMC Hospital Vellore Tamil Nadu PIN 632004 Vellore Tamil Nadu India Vellore TAMIL NADU 632004 India
Phone	04162283011
Fax	
Email	vijaygupta@gmail.com

Details Contact Person (Scientific Query)

Details Contact Person (Scientific Query)	
Name	Niranjan Thomas
Designation	Professor
Affiliation	CMC Hospital
Address	Department of Neonatology CMC Hospital Vellore Tamil Nadu PIN 632004 Vellore Tamil Nadu India Vellore TAMIL NADU 632004 India
Phone	04162283011
Fax	
Email	niranjan@cmcvellore.ac.in

Details Contact Person (Public Query)

Details Contact Person (Public Query)	
Name	Vijay Gupta
Designation	Sr PG Registrar
Affiliation	CMC Hospital
Address	Department of Neonatology CMC Hospital Vellore Tamil Nadu PIN 632004 Vellore Tamil Nadu India Vellore TAMIL NADU 632004 India

ACKNOWLEDGEMENT

First of all, I am grateful to Almighty God for enabling me to complete my postgraduate thesis with utmost honesty and sincerity.

I thank all the parents of preterm babies who extended their support to my work and lent their valuable time listening to me regarding my study. I am grateful for the trust and faith the parents had in me permitting their precious ones to be included in our study

I wish to express my sincere thanks to Dr Niranjan Thomas, Professor and Head of the Department of Neonatology, who guided and supervised my study. He always helped me with brilliant ideas and solutions to problems which we came across during the study. I am grateful and indebted to him for his constant encouragement and support throughout the study.

My sincere thanks to Dr Anil Kuruvilla, Professor, Department of Neonatology for his constant help and guidance throughout the study

I place on record, my sincere gratitude to Dr Sridhar Santhanam Professor, Department of Neonatology, for his constant help, support and encouragement.

I thank Dr Manish Kumar, Associate Professor, Department of Neonatology for his guidance and valuable opinion which helped me in pacing out my work and to finish it in time.

I thank all the doctors in our neonatal unit especially Dr Nelby, Dr Shabeer, Dr Abirami, Dr Benjamin, Dr Sumitha, Dr Annie, Dr Mintoo and all postgraduates from child health who helped me in my thesis with timely collection of samples, despite their busy schedule.

I thank Ms Sumithra and Ms Indu, Intensive Care technicians, who helped me in collecting innumerable blood gas samples required for the study

I thank Indira, our social worker, Hima our occupational therapist, nursing staff of the department of Neonatology who helped me selecting the study cases, translating the information into tamil for the parents and in obtaining parental consent after explaining in detail to parents in their respective mother tongues which would have been impossible task for me.

I thank Mr G Selvakumar, secretary Dept. of Neonatology for all time expert opinions and for solving problems as if they did not exist.

I express my thanks to Mr George for providing all the support and assistance at various moments during my course.

I thank Ms Grace, my biostatistician who solved the number game for my thesis and transformed them into meaning full results

I thank my parents whose constant prayers and blessings always guided me, my wife Prabha for constant support and encouragement, my kids Vaishnavi and Shaurya for ameliorating my tiredness with their smiles, my elder sister Alka who inspired me time and again to fight against the tough situations and to win over them.

I would like to express my appreciation to all my family members for their constant support, unceasing encouragement and prayers throughout.

I thank all those whom I was not able to name on this paper.

CONTENTS

Abbreviations

AAP	American academy of pediatrics
AEDF	Absent end diastolic flow
AFI	Amniotic fluid index
AGA	Appropriate for gestational age
BUN	Blood urea nitrogen
CDC	Centers for Disease Control and prevention
CI	Confidence Interval
CLD	Chronic lung disease
CRP	C reactive protein
EBM	Expressed breast milk
ELBW	Extremely low birth weight babies
ESPHAGN	European Society of Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition
GER	Gastro oesophageal reflux
HMF	Human milk fortifier
IVH	Intraventricular hemorrhage
LSRO	Life science research organisation
MDI	Mental developmental index
MEN	Minimal enteral nutrition

MIR	Mid infra red
NEC	Necrotising enterocolitis
NICU	Neonatal intensive care units
NNT	Numbers needed to treat
OEP	Osteopenia of prematurity
PDI	Psychomotor Developmental Index
PHM	Preterm human milk
PVL	Periventricular leucomalacia
REDF	Reverse end diastolic flow
ROP	Retinopathy of prematurity
SD	Standard deviation
SDP	Single deepest pocket
SEM	Standard error of mean
SGA	Small for gestational age
TPN	Total parenteral nutrition
VLBW	very low birth weight babies

INTRODUCTION

Human milk is considered the best source of nutrition for preterm newborn babies, due to several nutritional and immunologic advantages (1-9). Exclusive feeding with human milk has been shown to reduce morbidity and mortality related to neonatal sepsis and necrotising enterocolitis (10–15). Postnatal growth retardation is a serious and major concern in growing preterm very low birth babies, especially in low-mid income countries like India (16).

Growth failure in preterm very low birth weight (VLBW) babies has been attributed due to protein deficiency rather than energy deficit (17–19). There is physiologic decline in concentration of protein, sodium, zinc and other micronutrients throughout lactation. This physiologic decline in milk concentration of protein and micronutrients precedes any reduction in recommended daily requirements for preterm infants, leading to inadequate nutrient supply and finally growth failure (20).

Postnatal Growth failure has been shown to increase the risk of poor neurodevelopmental outcome at 18 months of age by Ehrenkrantz et al (21). Also, post natal weight gain was found to be better correlated with long term neurological outcomes as compared to appropriateness of weight for gestational age in study done by Latal – Hajnal et al (19).

VLBW premature babies exclusively fed unfortified human milk during hospitalization fail to show growth rates comparable to intra uterine growth rates due to inadequate protein and minerals in expressed human milk for growing premature babies (22-25). VLBW babies usually needs higher calories, protein and minerals to achieve adequate catch up growth (26) and to achieve this, fortification of human milk has been recommended as the standard of care (1).

Fortification of human milk to feed preterm babies is still a challenging task in developing countries like India. Much of the fortifiers used in the developed countries are not available in India. The only available human milk fortifier in India is Lactodex HMF. Another HMF "HIJAM" manufactured by "Endocura pharma pvt limited" has come recently into the market after this study was completed. There are however still several limitations with the use of lactodex HMF. This includes added daily cost (80 – 100 Rs /day, Rs 15 for each 2 gm sachet (27), lack of Iron and unavailaibility in smaller cities and towns (27-29). The other problem of using a 2 gm sachet is the difficulty to quantify the exact amount of HMF powder to be mixed with milk, for example if a mother expresses a limited quantity of milk (< 50 ml at a time) or if the infant is fed lower volumes. There are not many studies with HMF use in India. One study from Chandigarh (30) showed significantly improved weight gain pattern, linear growth and head circumference growth in the fortified group using Lactodex HMF as compared to unfortified group.

Unlike HMF, infant milk powder is freely available and is a cheaper alternative. The addition of infant milk formula powder to human milk (2g for each 50ml) will increase the protein content to 2.0- 2.9g/100ml of preterm human milk assuming variable protein concentration of preterm human milk ranging between 1.5- 2.4 g/100ml (20). In view of significant limitations of the available HMF and some reports in literature of use of term or preterm infant milk powder for human milk fortification (29, 31) we tested the hypothesis that fortifying human milk with infant milk powder would lead to better growth in VLBW babies.

AIM AND OBJECTIVES

AIM: To study the effect of human milk fortification with an infant formula as compared to unfortified human milk on the growth and biochemical parameters of preterm VLBW babies

a. Primary Objective:

To evaluate if fortifying expressed breast milk with formula milk powder improves weight gain in preterm VLBW babies when compared to use of unfortified human milk

b. Secondary Objective:

The secondary objectives were, difference between the two groups in terms of:

1. Linear growth - rate of length gain in cm/week
2. Head circumference- gain in cm/wk
3. Blood urea nitrogen, serum albumin and Pre albumin levels
4. Co-morbidities like feed intolerance, sepsis and NEC
5. Length of hospital stay

REVIEW OF LITERATURE

Epidemiology: Preterm population, India and worldwide

Globally 15 million babies are born premature each year, of which India accounts for nearly 23.6% of all preterm birth (32). Among all the live births 13% are born premature in India (32) as compared to 11.7% in the United states (2011) (33). More than 75% of these babies, who are born premature can be saved with feasible and cost effective interventions like antenatal steroids, essential new born care, breast feeding and Kangaroo mother care and rationale use of antibiotics to treat new born infections (34). In India, VLBW babies constitute nearly 4-7% of all live births and VLBW preterm babies account for nearly 30% of early neonatal deaths (35).

Postnatal growth failure

Following the birth and initial cardio respiratory stabilization of premature VLBW infant, nutrition plays a pivotal role in ensuring intact survival. Nutrition comprises of Total parentral nutrition (TPN) and Minimal eneteral nutrition (MEN) during the stages of early cardio respiratory instability followed by enteral nutrition using expressed human milk once the baby starts tolerating gavage or oral feeds.

Postnatal growth retardation is a major concern in growing preterm very low birth babies in high income countries (36) as well as in low- mid income countries like India (16). Human milk is considered the best source of nutrition for preterm newborn babies due to its several nutritional and immunologic advantages (1-9). However VLBW premature babies exclusively fed unfortified human milk during hospitalization fail to show growth rates comparable to intra uterine growth rates (22-25).

Atkinson et al (22) showed that VLBW babies fed their own mothers milk do not have adequate calcium and phosphorus intake, though the retention of sodium and potassium in first two weeks of life is comparable with intrauterine standards.

Tönz et al tried feeding preterm babies with higher protein concentration (2.5 g/dl) milk mixture (FM 85 , 85 Kcal /100ml) along with supplementation of calcium and phosphorus to attain growth rates comparable to intrauterine standards which was difficult with exclusive human milk feeding in view of inadequate protein concentration and other nutrients (23).

Cooper et al demonstrated better growth rate in preterm VLBW babies when fed preterm formula (containing 2.4 g/dl of protein; 4.1 g/dl of fat; 8.8 g/dl of carbohydrates; providing 81 kcal/dl with increased calcium, phosphorus and

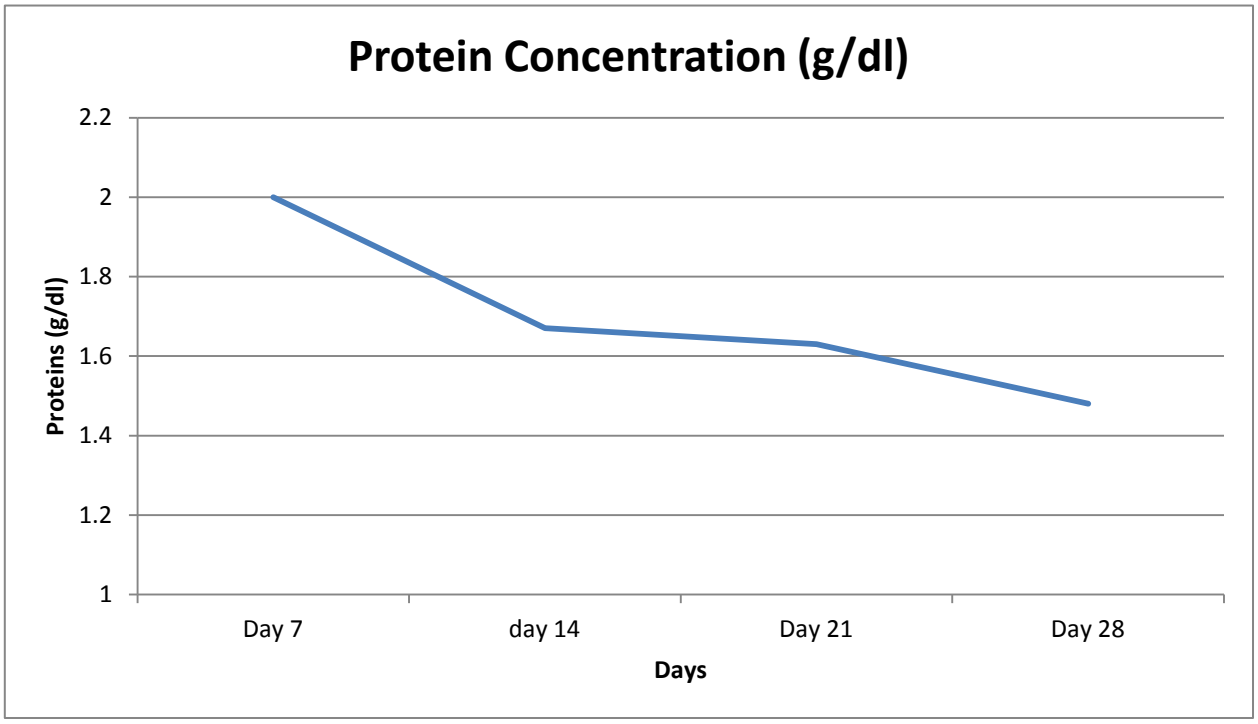
electrolytes as compared to breast milk) as compared to breast milk (weight gain; 27.7 g/day vs.17.2 g/day; $p < 0.001$). Head circumference growth, skin thickness fold was better in the preterm formula group as compared to expressed breast Milk (EBM) The time to reach weight of 1.8 kg was significantly shorter in the preterm formula group as compared to the EBM group (27 days vs 39 days ; $p < 0.001$) (24) .

This growth failure associated with un-supplemented human milk has been attributed mainly due to protein deficiency rather than total calories (17–19). With increasing duration of lactation there has been physiologic decline in the concentration of proteins and other nutrients (Table 1, Figure 1) like sodium and zinc in breast milk (20).

TABLE 1: Comparison of preterm human milk on day 7 and day 28 of lactation (20).

	Preterm HM (1 week)/ 100ml	**Preterm HM (1 month)/ 100ml**
Energy (Kcal)	67	69
Protein (g)	2.4	1.5
Fat (g)	3.8	3.6
Carbohydrate (g)	6.1	6.7
Calcium (mg)	25	29
Phosporus (mg)	14	9.3
Zinc (µg)	500	215
Vitamin A (IU)	560	227
Vitamin D (IU)	4	1.2

Figure 1: Protein concentration of Preterm human milk at different stages of lactation (37)



Impact of growth failure on long term outcomes:

Inadequate nutrient supply (mainly protein) because of this physiological decline of protein and micronutrients in human milk results in post natal growth failure (20). Improved post natal weight gain correlates with better long term neurological outcome (19) and postnatal growth failure has been shown to increase the risk of poor neuro-developmental outcome at 18 months of age (21).

Latal – hajnal et al demonstrated improved Psychomotor Developmental Index; PDI (mean $\pm$ SD) in SGA (89.9 $\pm$17.4 vs 101.8 $\pm$14.5; P<.001) and improved PDI (81.9 vs 95.1; P<.001) and Mental Developmental Index; MDI (94.9 vs 101.7, P=.05) in AGA babies who achieved adequate catch up growth (> 10 centtile) at 2 years of age as compared to infants with catch down growth (< 10 centile at 2 years age).The incidence of severe cerebral palsy also increased significantly in infants who do not achieve adequate catch up growth as compared to infants who achieve adequate catch up growth at 2 years (22.9% vs 1.2%; P=.008) (19)

Ehrenkranz et al showed significantly decreasing incidence of cerebral palsy, abnormal neurological examination , MDI and PDI scores < 70 at 18 – 22 months corrected age among ELBW cohorts with better weight gain pattern ranging from 12 g/kg/day (quartile 1) to 21.2 g/kg/day (quartile 4). Cerebral palsy at 18 – 22 months was diagnosed 8 times more in 1^{st} quartile cohort as compared to the 4^{th} quartile. Similarly the PDI < 70 and MDI $\leq$ 70 was almost twice as common in 1^{st} quartile as compared to 4^{th} quartile at 18 – 22 months corrected age. (21)

Poor linear growth and Poor neurodevelopment outcome has been closely linked, as illustrated by Ramel et al (38) where lower standardized Z-scores for length at 4 and 12 months chronological age was significantly associated with lower cognitive function score at 2 years of life. Studies (39-40) showing that improved linear and head circumference growth at 40 corrected weeks due to aggressive parental

nutrition in early part of life had positive impact on later (18 months) neurocognitive outcome**.**

Stephens et al**(40)** demonstrated 4.6 and 8.2 point increase in MDI at 18 months corrected age with every increase in 10 Kcal energy intake and added 1g/kg protein intake in first week of life respectively. Hence very low birth weight babies (VLBW) usually needs higher calories, protein and minerals to achieve adequate catch up growth and optimal development. (26)

NUTRITIONAL REQUIREMENT OF PRETERM BABY

Neonatal period represents the critical phase of brain growth especially in babies born premature and who are deprived of adequate parental and enteral nutrition for many reason related to cardio-respiratory instability and gut immaturity in early neonatal period. Nutritional deficits in the early and late neonatal period may lead to postnatal growth restriction (36, 41) and may have long term effect on the growth and neuro-developmental outcome (19, 21, 38, 42).

Though both protein and energy are important components required for optimal growth and development, their fine balance should be maintained in nutritional

formulas. Too low or too high protein energy ratio may lead to excess fat deposition in the adipose tissue and leading to long term morbidity (43).

Protein requirements of 3 – 4.4 g/kg/day with protein energy ratio of 2.6 – 3.4 have been advocated (43, 44). The more premature the baby the higher the daily protein requirements and hence the protein energy ratio (44).

Appropriate nutritional requirement is based on the assumption of supporting the growth velocity comparable to intrauterine growth rates (weight gain $\geq$ 15g/kg/day). Adequate protein supplementation is necessary to support growth, body composition and positive nitrogen balance (43).

Protein requirement are higher at lower gestational age (increased growth velocity) and gradually decreases with increase in gestational age (lower growth velocity) and corresponding weight (43).

Protein plays a important role in optimal neurodevelopment as it may be required for normal process of neurogenesis, dentritic arborization, synaptogenesis, myelination and cell signaling via growth factors and neurotransmitters (45). Hence inadequate protein intake is a limiting factor for growth (46) and neurocognitive development (47).

Increased intake of eneteral protein has a positive effect on weight gain pattern, linear growth and head circumference growth but no effect on subcutaneous tissue as measured by triceps skin fold thickness (43). Previously there were concerns that increased protein administration may result in metabolic acidosis, increased blood urea nitrogen levels, poor growth, and poorer neuro-developmental outcomes (48). However, safety with improved outcomes has been shown with the use of higher protein intake of the current new formulations and products (40, 43, 49-51).

Similarly kashyap et al (52) reported protein overload and higher blood urea nitrogen levels with protein intakes of 4.3g/kg/day and Protein / Energy (P/E) ratio of 3.6/100kcal. More recently Cooke et al demonstrated the safety with same P/E ratio with absolute mean protein intakes of 4.6 g/kg/day (53).

Presently, for optimal growth of preterm VLBW babies higher protein intake (range 3.5 – 4.5 g/kg/day) with adequate calories maintaining normal Protein / energy ratio is recommended (Table 2). Providing carbohydrate as source of non protein calories rather than fat improves protein accretion in enterally fed preterm VLBW babies as it reduces the oxidation of proteins (54). Hence when total calories are kept constant, nutritional formula which provides carbohydrate/ fat ratio of 2:1 improves protein accretion and growth as compared to a ratio of 1:1 or 1:2 (55).

Table 2: Nutritional Recommendations for preterm VLBW babies

	Tsang et al (56,57)	**LSRO(26)**	**Zieger et al (58)**	**ESPGHAN (59)**	**Canadian pediatric society(26)**	**AAP committee on nutrition (60)**	**Brown et al(43)**
Energy (kcal/kg/day)	110 – 130 (130- 150)*	110 - 135	119 – 127 (105 – 119)*	110 - 135	105 - 135	105 - 130	
Protein (g/kg/day)	3.4 – 4.2 (3.8 – 4.4)*	3.4 – 4.3	3.9 – 4.0 (4.0)*	3.5 – 4.5 (4- 4.5)*	3- 4 (3.5 – 4)*	3.5 – 4.0	3.5 – 4.5 (3.8 – 4.5)*
Protein / energy (g/ 100 kcal)	2.8 – 3.4	2.5 – 3.6	3.1- 3.4 (3.4 – 3.8)*	2.25 – 3.1	2.5 – 3.0	2.9 – 3.3	

* ELBW babies

Kashyap et al (52) demonstrated improved weight gain pattern, linear growth and head circumference growth with minimal effect on triceps skin fold thickness by increasing the protein intake from 2.24 g/kg/day to 3.6 g/kg/day, keeping the energy intake constant (115 kcal /kg/day). On the other hand, only the weight gain and triceps skin fold thickness increased with no or minimal effect on linear growth and head circumference growth by increasing the energy intakes from 115 kcal/g/day to 149 kcal /kg/day keeping protein intake almost constant (3.5 – 3.6g/kg/day). Hence excess protein administration relative to energy is catabolised rather than supporting lean body mass growth. Similarly excess calorie intake relative to protein results in building up of fat in adipose tissue (43) and does not contribute to linear growth.

Fortification options

There are several milk fortifiers available in the western market which when added to preterm human milk act to bridge the nutritional gap and aim to provide recommended enteral nutrition for the preterm VLBW babies. In several studies the use of HMF was found to be safe with improved growth and nutritional parameters in preterm VLBW babies as compared to administration of unfortified human milk (61-63). Below is the detailed list of several fortifiers available with their nutrient composition.

Table 3: Nutritional composition of various human milk fortifiers(47).

Composition of HMF	Similac abott nutrition (3.6 g) (64)	Similac special care 30* (75 ml for each 100ml PHM) (56).	Enfamil premature 30* (75 ml for each 100ml PHM) (56).	Aptamil FMS (4.3 g) (65)	BEBA FM 85 (5g) (65)	Enfamil HMF Mead Johnson (4 packets)	The Enfamil Human Milk Fortifier Acidified Liquid (HMF-AL (4 vials) (56,66)	Similac HMF liquid(5ml) (4 vials) (56,67)	Cow & Gate nutriprem# (68)	SMA breast milk fortifier# (68)
Energy (kcal)	14	76	75	15	17.35	14	30	27.4	15	14.6
Protein (g)	1	2.28	2.27	0.8	1	1.1	2.2	1.4	0.8	1
Fat (g)	0.36	5.0	3.9	0	0.02	1	2.3	1.1	-	0.16
Carbohydrate (g)	1.8	5.9	8.3	3	3.3	<0.4	<1.2	3.2	3	2.73
Calcium (mg)	117	135	126	62	75	90	116	140	65	90
Phosphorus (mg)	67	75	63	43	45	50	63	80	46	46
Zinc (mg)	1	1.1	1.1	0.4	0.3	0.72	0.96	1.2		
Vitamin A (IU)	620	938	953	413	200	950	1160	788	216	450
Vitamin D (IU)	120	113	180	192	-	150	188	140	200	304

* Nutrient values provided for each 75 ml fortifier. # Nutrient values for HMF to be added to 100 ml preterm human milk

GOALS OF FORTIFICATION

The idea of fortifying human milk comes from the prevalence of wide spread postnatal growth failure in preterm very low birth weight babies (16,36). Though human milk is ideal for infant nutrition, (1-9) it has been observed that babies fed exclusively human milk grow slower as compared to babies fed on preterm formula feeds (69,70). As described above this has been attributed to declining nutritional contents of preterm human milk with increasing duration of lactation (20). So, to retain the nutritional and immunological advantages associated with feeding of breast milk and to optimise growth, preterm human milk is fortified to achieve target nutrient composition which may support post natal growth comparable to intrauterine growth standards (> 15 g/kg/day) (56). The various fortifying agents to achieve the same have been elaborated in table 3.

Individual macronutrient (protein, fat, carbohydrate etc) can also be added alone to human milk or to already fortified human milk as and when the need arises to achieve the optimal nutrient intake as per recommendations. They can also be used as a part of individualized fortification, where there is need to add a specific nutrient depending on the analyzed milk content or metabolic response of the baby. Available supplements like Similac liquid protein (1g/ 6ml)(56), Aptamil Protein+ powder 0.82 g protein/1g (65), beneprotein powder 0.86g protein/ g(64), Microlipid, safflower oil fat emulsion (0.5 g fat /ml) and Polycose polymer powder (0.94g carbohydrate / g)(64) can be used for selective macronutrient fortification to

achieve the target nutritional composition of preterm human milk (4.4 g/100 ml of fat, 8.8g/ 100 ml of carbohydrate and 3g/100 of protein) as per ESPGHAN guidelines (when total fluid intake is 150 ml/kg/day) (59,64) Hair et al also suggested the use of human milk derived cream as an adjunctive supplement to preterm human milk based diets to improve the linear and weight growth patterns in preterm VLBW babies(71).

There were some concerns regarding the use of bovine milk derived human milk fortifiers which gave way to the development of Human milk derived fortifiers (TABLE 4) for feeding of preterm Infants (56,72,73) Human based fortifiers have been shown to reduce the risk of NEC as it is free of bovine milk antigen (65). These fortifiers are available in various additive concentrations so that the treating physician can choose different HMF preparation to be added to human preterm milk depending on the total daily fluid requirements of the baby (56). The use of human milk based fortifiers (HMF 60) are associated with remarkable growth velocity reaching around 24.8 $\pm$5.4 g/kg/day (74) as compared to bovine HMF 40, HMF 100 or bovine HMF.

Table 4: Exclusive Human milk derived fortifiers (56).

	Prolacta plus $4H^2$ HMF 20 ml For 80 ml PHM (20ml)	**Prolacta plus $6H^2$ HMF 30 ml For 70 ml PHM (30ml)**	**Prolacta plus $+8H^2$ HMF 40 ml For 60 ml PHM (40ml)**	**Prolacta plus $+10H^2$ HMF 50 ml For 50 ml PHM (50ml)**
Calories (kcal/kg/day)	28	42	56	71
Protein (g)	1.2	1.8	2.4	3.0
Fat (g)	2.8	2.8	3.6	4.6
Carbohydrate (g)	2.7	2.7	3.6	4.5

As concerns for the risk of bacterial contamination with the use of powdered fortifier and subsequent bacteraemia exist, the Centres for Disease Control and Prevention (CDC) do not recommend the use of powdered formulas and milk fortifiers for feeding preterm infants (75,76). Acidified liquid HMF with higher protein concentration were later introduced to counter the risk of bacterial contamination associated with powdered supplements and to support the growth as well (77).

APPROACHES TO FORTIFICATION

There are two different approaches described to fortify preterm human milk:

1. Standard fortification
2. Individualised fortification
    a. Targeted fortification/ tailored fortification
    b. Adjustable fortification

STANDARD FORTIFICATION

This method of fortification implies addition of fixed dose of fortifier (powder/ liquid) to a fixed quantity of preterm human milk (with presumed assumption of 1.5g/dl of protein concentration in preterm milk produced at 2 weeks of lactation (13). This method does not take into account the varying caloric and nutrient concentration at different stages of lactations, different methods and time of milk

expression as well as varying composition between different mothers (37,49,78,79). It is well known that there is gradual decline of protein in the breast milk with increasing duration of lactation (80).Therefore, the resulting fortified formulation may have less calories and protein than what is expected, and hence may lead to growth faltering due to protein and other nutritional deficiency (46,56,81).

Despite growth benefits with use of multi-component fortification (63) the growth of preterm babies receiving standard multi-nutrient fortification differs quantitatively and qualitatively from the ideal fetal growth velocity and was much slower compared to preterm infants who were fed preterm formulas(15,69,70). The actual protein intakes were found to be significantly lower by 0.5 – 0.8 g/kg/day than assumed with little or insignificant difference in the energy intake when standard method of fortification was used (46,47). Therefore individualized fortification is a recent concept and is considered the best recommended strategy for fortification of human milk (82).

The problem of protein under nutrition associated with standard fortification can be alleviated by individualized fortification which can be done in two ways:

TARGETED FORTIFICATION:

In this strategy, native preterm human milk is analysed for macronutrient content at regular intervals using mid infra red (MIR) spectroscopic analyser (49) and fortified appropriately to reach the desired or target protein concentration (3.5 g/kg/day) (56,83). The concept of targeted fortification was introduced by Polberger et al showing improved enteral protein intakes resulting in optimal growth, removing the variability bias of protein concentration in human milk (83).

Fortification done via this method is a 3 step procedure;

1. Analysis of macronutrient composition in native human milk sample using the MIR(Milkoscan) (49)
2. Addition of routine fortifier powder / liquid to preterm human milk
3. Pre defined additional amounts of macronutrient (Protein, fat and / or carbohydrate) is / are added (native breast milk nutrient concentration + nutrient increment by routine fortification) to achieve the macronutrient concentration as per recommended guidelines (64).

Hence in targeted fortification, frequent analysis of human milk (once or twice weekly) as suggested by Polberger et al. (78,83) and adjustment of its macronutrient composition as per recommended guidelines avoids under / over nutrition of the baby and is proved to be safe and feasible (64). This method helps in significantly

reducing the amount of fortifier used significantly and also prevents the risk of feed intolerance due to increased milk osmolality.

Adjusted fortification:

In this strategy preterm human milk is fortified depending on the metabolic response of the baby (levels of blood urea nitrogen) to the overall protein intakes (47). The amount of fortifier (protein) to be added to the preterm human milk depends on the changes in serial measurements of blood urea nitrogen values, which are considered as surrogate markers of protein nutriture and a range of 9 -14 mg/dl is targeted (56,84).

This model of fortification avoids inadequate or excessive protein intake and was found to be more practical and feasible in units where MIR analyser is not available (84). It was shown to provide adequate enteral proteins resulting in optimal growth comparable to intrauterine growth standards (84). This method of fortification has been promoted and implemented successfully in several Italian NICUs (85). However the only drawback is that, BUN values do not always correlate with protein adequacy in the first week of life and may merely reflect renal immaturity of VLBW and ELBW babies (86,87).

FORTIFICATION OF MILK IN INDIA

Fortification of human milk to feed preterm babies is still a challenging task in developing countries like India. Much of the fortifiers used in the developed countries (as mentioned in TABLE 3 and 4) are not widely available in India. The only available human milk fortifier in India is Lactodex HMF (Raptakos, Brett & Co. Ltd) and more recently HIJAM (Endocura pharma pvt limited) (88). There are several limitations with the use of Lactodex HMF in India. It is not easily available in small towns and cities. Fortification of Human milk with Lactodex HMF cost Rs 80 – 100 per day (assuming consumption of 300 ml milk daily for 1500 g preterm baby requiring 6 sachets of HMF each costing around 15 Rs for 2g). Iron supplementation is required along with fortification to meet the daily recommended intake (27-29). Another practical issue with use of 2g sachet is the difficulty to quantify the exact amount of powder to be mixed with expressed milk if mother expresses limited quantity of milk (< 50 ml at a time) or if the infant is fed lower feeding volumes as there is no measuring unit available to add less than 2gm powder (eg; 0.5g and 1 g). There is only one study from Chandigarh, India (30) which has looked at the use of this HMF in preterm population. Mukhopadhyay et al (30) demonstrated significantly better weight gain (15.1 vs 12.9 g/kg/d, P <0.001), significantly better linear growth (1.04 vs 0.86 cm/week, P = 0.017 and significantly better head growth (0.83 vs 0.75cm/week, P<0.001) with fortification of milk using Lactodex HMF as compared to unfortified EBM in preterm (< 34 weeks) very low birth weight infants. In the sub group analysis, SGA infants were

found to have significantly better weight gain (16g/Kg/d vs 12.9g/kg/d, P = 0.002) and linear growth (1.09 cm/week vs 0.92 cm/week, P = 0.042) compared to controls whereas only linear growth (1 cm vs 0.82 cm; p = 0.006) was significantly better among the AGA groups as compared to controls.

The use of HMF is difficult in developing countries like India due higher cost, limited availability and the risk of bacterial contamination (89). HIJAM HMF has been recently introduced in the Indian market but no studies are available on its use. Its macronutrient composition is much better as compared to Lactodex HMF (88). (Table 5) Use of HIJAM HMF along with preterm human milk may somewhat approaches ESPHAGAN guidelines. Additional cost (Rs 12/ 1 g sachet, Rs 120 – 140 /day), higher calcium, phosphorus levels and protein crossing upper end of normal especially in early periods of lactation when protein concentration is higher in preterm milk, are its limitation. Many people still do not advocate the routine use of fortifiers and reserve its use in cases of growth faltering in preterm (< 32 weeks) VLBW babies in India (88).

Table 5: Nutrient composition of Preterm Human Milk and various fortifying options available in India (20, 27, 88).

Nutrition	Preterm Human Milk	Infant Milk Formula used	Lactodex HMF	HIJAM HMF
Calories (Kcal)	69	4.9	3.7	3.5
Protein(g)	1.5	0.125	0.1	0.25
Fat(g)	3.6	0.26	0.05	0.25
Calcium(mg)	29	8.2	25	25
Phosphorus (mg)	9.3	4.1	12.5	12.5
Iron (mg)	0.12	0.06	-	0.36
Vitamin A (IU)	227	28	60	155
Vitamin D (IU)	1.2	36	19	100

Table 6: Total Nutrients received by the infant using one of the feeding options

Nutritients	Preterm human milk @ 200 ml/kg/day	Infant Milk Formula used with preterm human milk @ 200 ml/kg/day	Lactodex HMF used with preterm human milk @ 200 ml/kg/day	HIJAM HMF used with preterm human milk @ 200 ml/kg/day
Calories (Kcal/kg/day)	138	177.2	167.6	166
Protein(g/kg/day)	3	4	3.8	5
Fat(g/kg/day)	7.2	9.28	7.6	9.2
Calcium(mg/kg/day)	58	123.6	258	258
Phosphorus (mg/kg/day)	18.6	51.4	118.6	118.6
Iron (mg/kg/day)	0.24	0.72	-	3.12
Vitamin A (IU)	454	678	934	1694
Vitamin D (IU)	2.4	290.4	154.4	802.4

FORMULA POWDER USED AS HMF:

In places where standard preparations of HMF are not available or its use is limited because of financial or practical constraints, there are some reports of infant milk powder being used for the fortification of preterm human milk in the literature **(29, 31, 90, 91).**

Chowdhary et al. (31) from Delhi, India justified using term infant milk powder for fortifying preterm human milk in view financial constraints.

Sankar et al (29) from India suggested using preterm infant formula(Dexolac Special Care [Wockhardt Co.], Pre-Lactogen [Nestle Co) for fortification of human milk when HMF can't be used because of unavailability or cost factor.

Khorana et al (90) conducted a pilot study from Thailand comparing the post-discharge milk powder formula used as a fortifying agent with HMF for preterm human milk fortification. They did not find any significant differences in terms of growth parameters, biochemical parameters, duration of stay, morbidities (definite NEC and osteopenia of prematurity) between the two groups. The use of post discharge formula for human milk fortification was found to be 19 times cheaper as compared to the use of HMF in their study.

Zuckerman et al (91) randomised feeding very low birth infants with breast milk versus breast milk fortified with preterm formula containing high calcium (550 mg) and phosphorus (300mg) concentration. There was no difference in terms of weight gain, radiological rickets, serum mineral levels though intake of calcium and phosphorus was higher in the fortification group as compared to unfortified milk.

RATIONALE FOR DOING THE STUDY

There are concerns with the use of HMF (Lactodex HMF) in India as discussed in the previous sections. Unlike HMF, infant milk powder is freely available in Indian market and a cheaper alternative to HMF. The addition of infant milk formula powder to human milk (2g for each 50ml) achieves a reasonable nutrient formulation (table 6) for feeding preterm VLBW babies in resource limited settings. The protein content reaches to 2.0- 2.9g/100ml assuming variable protein concentration of preterm human milk ranging from 1.5- 2.4 g/100ml (20). The nutrients like iron, calcium, phosphorus and multivitamins can be added as usual to make up the nutrients as per target recommendations. There are some reports in literature on the use of term or preterm infant milk powder for human milk fortification (29,31)) including a pilot study done from Thailand (90) but there are no large controlled trials. With this background, we planned a randomized controlled trial to test the hypothesis that fortifying human milk with infant milk powder would lead to better growth in preterm VLBW babies.

MATERIAL AND METHODS

Design: Prospective, open, parallel group, randomized control trial.

Setting: Tertiary care neonatal unit in south India.

Participants: All babies < 34 weeks and <1500gms born during the study period (November 2013 to December 2014) were included in the study.

Exclusion criteria: Any baby with major congenital malformation, necrotizing eneterocolitis stage 2 or stage 3, not reaching full volume feeds by day 21 of life, or parents not willing to participate were excluded from the study.

Gestation age was calculated based on the last menstrual period / 1st trimester ultrasound dating. In cases of discrepancy gestational age assessment was done postnatally using the Dubowitz assessment.

The Institution review board and Ethics committee approval was obtained and the trial was registered at the clinical trials registry (CTRI/2013/11/004149 on 19/11/2013). Parents of babies who fulfilled the inclusion and exclusion criteria were approached and informed consent obtained.

Randomization and allocation concealment: The babies were randomized into two groups (fortified human milk or unfortified human milk) once the babies reached full feeding volumes (150ml/kg/day) using stratified block randomization (stratified according to birth weight- < 1250 and 1250 to <1500 g with block size of 2:3). Statistician involved in the study generated the random allocation sequence and serially numbered opaque sealed envelopes were used to conceal the allocation

Methods: Fortification of human milk was done using an infant milk formula powder (see table 5 for contents). Each 25 ml of expressed breast milk was fortified with addition of 1gm infant milk formula powder (Simyl LBW ^{TM}, FDC Limited). Final osmolality of fortified milk with infant milk powder was measured using freezing point depression osmometer (Osmomat 030 Germany) and was 397Miliosmol/kg. Feeds (gavage/paladai) were given every 2-3 hours, graded up to 200 ml/kg as per the nursery protocol. The fortified milk was used within 3 hrs at room temperature, thereafter it was discarded. To standardize the measuring of milk powder from the 200 gm tin can, a standardized spoon was used (0.5 g/scoop-spoon was validated with an error of +/- 0.05g). All babies in both the groups were supplemented with extra calcium(28 mg/day), phosphate (66mg/day), iron (6.2mg/day)and multi-vitamin drops (B complex , vitamin C 40 mg, Vitamin E 1.5 mg, vitamin A 1000IU and vitamin D 400 IU) as per current nursery protocols. Data forms were filled during the study period and were analysed at the end. The control arm continued to get the same care except for the fortification of milk.

The baseline anthropometric measurements- Weight in grams (using calibrated electronic weighing scale [Essae DS 852, Essae Teroka Limited India] with error +/- 5g) ,length in cms (using infantometer) and head circumference (using non stretchable tape to nearest of 0.1cm) were measured at the time of randomization. Babies were subsequently weighed daily and length and head circumference measured weekly until they reached weight of ≥1800 g. Base line blood urea nitrogen and blood gas was done on the day of randomization and thereafter once weekly from the date of randomization until the baby reached 1800 g. Routine metabolic work up including serum calcium, phosphorus and alkaline phosphatase levels were done at 4- 6 weeks of chronological age as per the nursery protocol. In addition, serum albumin and pre albumin were also done at this time. Calcium, phosphorus, alkaline phosphate and serum albumin were analysed by calorimetric method using Beckman Coulter AV5800, Ireland. Serum Pre albumin and Urea were analysed by quantitative immune-turbidimetric assay and urease method respectively by the Beckman Coulter AV5800 Analyser, Ireland. The laboratory is National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited and in addition to internal quality assurance, runs the external quality assurance from Biorad, RCP, Australia.

Blinding was not possible for the caregivers and the parents because of the nature of intervention. Measurement of outcome variables (like weight gain, linear growth and head circumference) and statistical analysis was however blinded.

Data safety and monitoring: To monitor the trial, Data safety monitoring board (DSMB) committee was instituted to review the data submitted to the committee every 6 months. As per our ethical committee recommendations, to offset the risk for the patient, if a baby in control arm failed to achieve a weight gain of at least 10 g/kg/day by the end of 4 weeks from the date of randomisation, fortification of milk was started. Baby will continue to receive unfortified human milk along with usual vitamin and mineral supplementations if fortification was withheld withhold for any reason in the fortification arm. Babies in both groups who broke the protocol were analysed in the group, they were randomised (intention to treat analysis)

Outcome: The primary outcome measure was weight gain in g/kg/day in the two groups from the date of randomization until the baby reached 1800 g. The primary outcome, weight gain /kg/day was the mean of weight gain /kg from the day of recruitment until the end point (baby reaches $\geq$ 1800 g). The denominator used each day for calculating the weight gain was the birth weight or the previous day weight whichever was higher (92). The secondary outcome measures were linear growth (length gain in cm/ week calculated as (length on the end point – length on the day of recruitment) X 7/ no. of days baby was in study), head circumference increase (Head circumference gain in cm/ week calculated as (head circumference on the end point – head circumference on the day of recruitment) X 7/ no. of days baby was in study), duration of hospital stay and co morbidities like feed intolerance, sepsis and necrotizing enterocolitis between the two groups.

Definitions:

Feed intolerance: presence of vomiting (bilious), abdominal distension and presence of prefeed gastric aspirate >50% of feed volume (93, 94).

Necrotising eneterocolitis: as per modified bells criteria (95)

Sepsis: newborn with clinical signs and symptoms with elevated CRP or with blood culture proven sepsis.

Abnormal uterine artery dopplers: S/D ratio $\geq$ 3 after 30 weeks of gestation (96)

Oligohydramnios: AFI < 5 for oligohydramnios (single deepest pocket SDP <2) (97)

Metabolic acidosis: ph < 7.25 and serum bicarbonate < 17 meq/l (98)

Anemia requiring packed cell transfusion (99)

Hyponatremia : < 135 meq/l (98),

Hypocalcemia: < 7 mg/dl (100),

Osteopenia of prematurity(OEP); alkaline phosphatise levels >420IU/l and phosphorus levels <4.5 (101-103,

Hypoalbuminemia : serum albumin < 2.0g/dl (101)

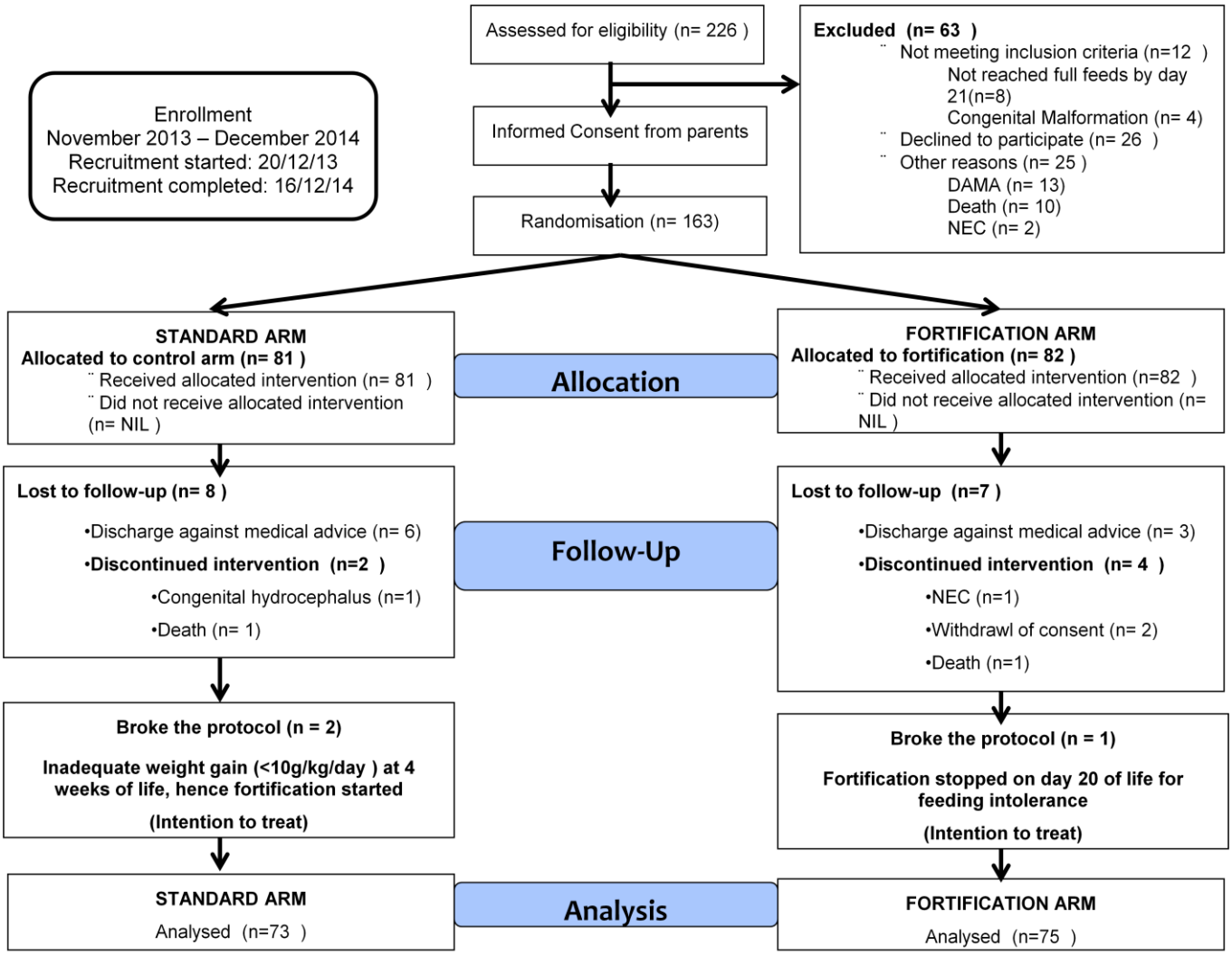
Statistical analysis

Sample size: Target sample size was calculated to be 69 in each group for a power of 90% with Alpha error of 5% for a 2 tailed test (based on Indian study by Mukhopadhyay et al (30) showing the difference in the mean weight gain to be 2.2 and std deviation of 4 gm/kg/day in each group ($p<0.01$). To account for a 20 % loss to follow up in each arm, a total of 85 babies were recruited in each arm.

Analysis was on an intention to treat basis. Groups were compared by using student's t-test for continuous variables and Pearson's chi-square and Fisher's exact test for categorical variables. P value of <0.05 was considered significant.

RESULTS

Figure 2: Consort flow diagram for randomised controlled trial



Of the 226 eligible babies, 163 babies (81 in standard arm and 82 in fortification arm) were randomised into the study. A total of 63 babies were excluded prior to randomisation because they did not meet inclusion criteria or refused informed consent. Of these, 148 (90.8%) babies (73 in standard arm and 75 in the Fortification arm) completed the study and were available for analysis (Figure 2).

In the standard arm 8 of the 81 babies were excluded from the study (Figure 2), leaving 73 for final analysis. Similarly 7 babies in the fortification arm were excluded from the study after randomisation, leaving 75 for final analysis. One baby in the fortification arm developed NEC on day 7 of fortification (intervention) and was excluded from the trial. Two babies, 1 in standard arm and another in fortification arm died after randomisation due to septic shock and inborn error of metabolism respectively. There were two babies in the standard arm who were started on fortification because of inadequate weight gain (<10g/kg/day) by 4 weeks of age and 1 baby in fortification arm where fortification stopped in view of persistent feed intolerance. All 3 babies were analysed in their respective arm in which they were initially randomised (intention to treat analysis).

Tables 7: Base line neonatal demographic variables

	Standard (n= 73)	Fortification (n= 75)	
Variable	**Mean ±SD**	**Mean ±SD**	**P value**
Gestational age	31.2±1.6	31.2±1.5	0.89
Male *	38 (52.1)	40 (53.3)	0.88
Female*	35 (47.9)	35 (46.7)	
Birth weight (g)	1234.8 ±190.8	1242.3±170.9	0.80
Head circumference at birth (cm)	26.7±1.4	26.8±1.3	0.56
Length at birth (cm)	38.1±2.0	38.2±2.1	0.94
Weight at recruitment (g)	1180.8±190.5	1175.8±166.0	0.86
Head circumference at recruitment (cm)	27.3±1.4	27.3±1.2	0.72
Length at recruitment (cm)	38.8±1.9	38.7±1.9	0.85
Day of recruitment	11.4±3.5	10.9±3.4	0.38

*Values expressed as n(%) and p value < 0.05 as significant

All baseline neonatal demographic variables were comparable between the two groups. The mean (± SD) birth weight in the standard and fortification arm was 1234.8±190.8g and 1242.3±170.9g (p= 0.8) respectively. The mean (±SD) gestational age in the standard and fortification arm was 31.2 ± 1.6 weeks and 31.2 ± 1.5 weeks (p= 0.89) respectively (Table 7). The gender ratio was similar in both the groups (male; 52.1% vs 53.3 %; p = 0.88). The mean (± SD) weight at recruitment in the standard and fortification arm also was not different (1180.8±190.5g and 1175.8±166.0g p= 0.86). Other baseline demographic variables, anthropometric variables (length and head circumference) at birth and at the time of recruitment were similar in both the groups. Mean (± SD) age at which the babies were recruited into the trial once the babies were on full volume feeds was 11.4 ± 3.5 days and 10.9 ± 3.4 days (p = 0.38) in standard arm and the fortification arm respectively.

Tables 8: Base line antenatal maternal characteristics and labour details

	Standard (N= 73)	Fortification (N= 75)	
Variable	**n(%)/mean ±SD**	**n(%)/mean ±SD**	**P value**
Booked	71(97.3)	73(97.3)	1.00
Primigravida	44(60.3)	31(41.3)	**0.02**
Multigravida	29(39.7)	44(58.7)	
Hypertensive disorders	36(49.3)	38(50.7)	0.87
Gestational diabetes mellitus	2(2.7)	8(10.7)	0.10
Antepartum hemorrahge	4(5.5)	9(12.0)	0.16
Abnormal uterine artery doppler	19(54.3)	22(64.7)	0.65
Absent end diastolic flow / Reverse end diastolic flow	10(43.5)	5(33.3)	0.53
Oligohydramnios	9(22.5)	14(29.2)	0.48
Antepartum steroids	67(94.4)	70(94.6)	1.00
Risk of sepsis	31(42.5)	34(45.3)	0.73
Normal delivery	24(32.9)	16(21.3)	0.11
Apgar score (5 min)*	8.8 ±1.2	8.6 ±1.1	0.30
Apgar score (10min)*	9.59 ± 0.7	9.41± 0.7	0.15

*Values expressed as n(%) or mean ± SD and, p value < 0.05 as significant. Abnormal dopplers defined as ≥ 3 after 30 weeks of gestation (105), Oligohydramnios: AFI <5 cm or SDP < 2 cm (97)

Majority of the mothers (97.3%) were booked in both the groups (Table 8). The number of primigravida mother were found to be significantly more in the standard arm as compared to the fortification arm (60.3% vs 41.3% ; p = 0.02). However this may not have any bearing on our primary and secondary outcomes. Maternal risk factors like hypertensive disorders (49.3% vs 50.7%; p= 0.87), gestational diabetes mellitus (2.7% vs 10.7 %; p = 0.1) and antepartum haemorrhage (5.5% vs 12%; p = 0.16) were comparable in the standard and the fortification arm respectively. There were 54.3 % mothers with abnormal uterine artery doppler in the standard arm as compared to 64.7 % mothers in the fortification arm (p= 0.65). The incidence of oligohydramnios (AFI < 5cm and SDP < 2cm) were comparable in both groups (22.5% vs 29.2%; p = 0.48). Nearly 94% mothers in each group received antenatal steroids. Antenatal risk factors for sepsis in newborn were comparable in both groups (42.5% vs 45.3%; p = 0.73). Around 32.9% mothers delivered normally in the standard group as compared to 21.3 % in the fortification group (p = 0.11) but this was not statistically significant. Apgar scores (Mean $\pm$ SD) at 5minutes (8.8 $\pm$ 1.2 vs 8.6 $\pm$ 1.1; p = 0.3) and 10 minutes (9.6 + 0.7 vs 9.4 +0.7; p = 0.15) were similar in both groups.

TABLE 9: Base line neonatal morbidity prior to intervention/ randomisation

	Standard (N = 73)	Fortification (N= 75)	
Variable	**n(%)/mean ±SD**	**n(%)/mean ±SD**	**P value**
Depression at birth[##]	18(24.7)	18(24)	0.93
Transient tachypnea	14(19.2)	15(20)	0.90
Hyaline membrane disease	18(24.7)	20(26.7)	0.78
hsPDA	9(12.3)	13(17.3)	0.39
Apnea of prematurity	10(13.7)	7(9.3)	0.41
Air leak syndrome	1(1.4)	4(5.3)	0.37
Feed intolerance	27(37.0)	18(24)	0.09
Metabolic acidosis*	21(28.8)	23(30.7)	0.80
Sepsis	9(12.3)	11(14.7)	0.68
Babies requiring			
• Respiratory support (CPAP/ High flow/ IMV/HFO)	32(43.8)	35(46.7)	0.73
• Packed cell transfusion[#]	3(4.1)	5(6.7)	0.72
• Central lines	61(83.6)	68(90.7)	0.20
Hyponatremia[¥]	36(52.2)	36(48.6)	0.67
Hypocalcemia [Ψ]	8(12.5)	13(19.7)	0.27
Blood urea nitrogen on recruitment day (mg/dl)	8.7±5.8	8.4±5.2	0.7

*Metabolic acidosis: ph < 7.25 and bicarbonate <17 meq/l (98), [#]Transfusion criteria for anemia (99); [##]depressed at birth: apgar scores < 6 at 5 minutes (104,105) , Hyponatremia[¥] : < 135 meq/l (98), hypocalcemia [Ψ]: < 7 mg/dl (100)

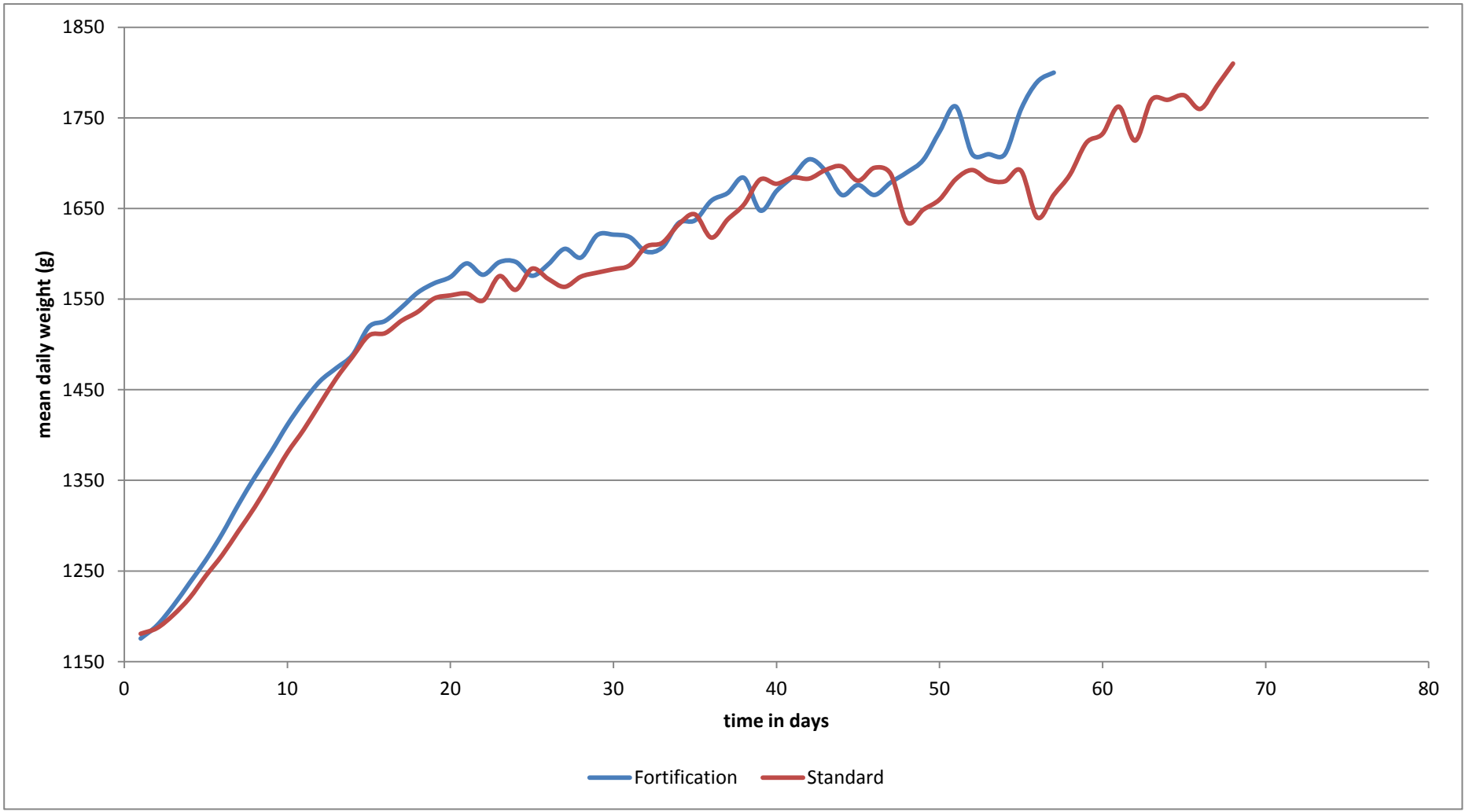
The early neonatal morbidities (Table 9) like depression at birth, transient tacypnea of newborn, hyaline membrane disease, apnea of prematurity, air leak syndrome and hemodynamically significant patent ductus arteriosus were comparable in both the arms. There was no difference between the two groups with respect to babies requiring any form of respiratory support (CPAP, High Flow or mechanical ventilation), insertion of central lines (umbilical venous catheter or inserted central venous catheter) or requiring packed cell transfusion for anemia before recruitment into the study. Though the incidence of sepsis prior to randomisation (probable and / or blood culture positive sepsis) was more in the fortification group as compared to standard group (12.3% vs14.7 %; p = 0.68), this was not statistically significant. Similarly the incidence of feed intolerance was more in the standards arm as compared to fortification arm prior to randomisation (37% vs 24%; p = 0.09) but it was statistically not significant. The incidence of metabolic acidosis prior to randomisation was also comparable between the two groups. There was no significant difference with respect to incidence of hyponatremia (52.2% vs 48.6% ; p = 0.67) and hypocalcemia (12.5 % vs 19.7 % ; p = 0.27) between the standard and fortification groups. The mean $\pm$ SD blood urea nitrogen levels (8 $\pm$ 12.5 vs 13 $\pm$ 19.7; p = 0.27) on the day of randomisation were not different between the two groups.

Table: 10 Outcome variables: Anthropometric variables between the two groups

	Standard (N= 73)	**Fortification (N= 75)**	
Variable	**Mean ±SD**	**Mean ±SD**	**P value**
Weight gain (g/kg/day)	16.1±2.9	18.03±2.91	**<0.001**
weight gain (g/ day)	24.2±5.4	27.38±5.69	**<0.001**
Linear growth (cm/week)	0.96±0.23	1.04 ±0.21	**0.02**
Head circumference growth (cm/ week)	0.9±0.2	0.97±0.19	0.12
Subgroup analysis (wt < 1250 g)	**Standard (N=35)**	**Fortification (N= 32)**	
Weight gain (g/kg/day)	15.7±2.7	17.1±2.5	**0.03**
Linear growth (cm/week)	0.91±0.18	1.02 ±0.13	**0.01**
Head circumference growth (cm/ week)	0.87±0.15	0.91±0.18	0.31
Subgroup analysis (wt > 1250 g)	**Standard (N=38)**	**Fortification (N= 43)**	
Weight gain (g/kg/day)	16.38±3.1	18.72±3.0	**0.001**
Linear growth (cm/week)	0.99±0.27	1.06 ±0.25	0.23
Head circumference growth (cm/ week)	0.97±0.23	1.02±0.19	0.31

P value < 0.05 considered as significant.

Figure 3: Mean daily weight of babies plotted against time in two groups



Primary outcome variable:

The weight gain velocity was significantly better in the fortification group (16.06 ± 2.9g/kg/day vs 18.03 ± 2.9 g/kg/day; p<0.001) as compared to the standard group (Table 10 & figure 3). The weight gain velocity remained significantly better in the fortification arm even on subgroup analysis (weight gain velocity for <1250g: 15.7±2.7g/kg/day vs17.1±2.5; p=0.03 and weight gain velocity for >1250g: 16.38±3.1g/kg/day vs18.72±3.0;p=0.001) when compared to standard arm.

Figure 4: Mean weekly length of babies in both the groups

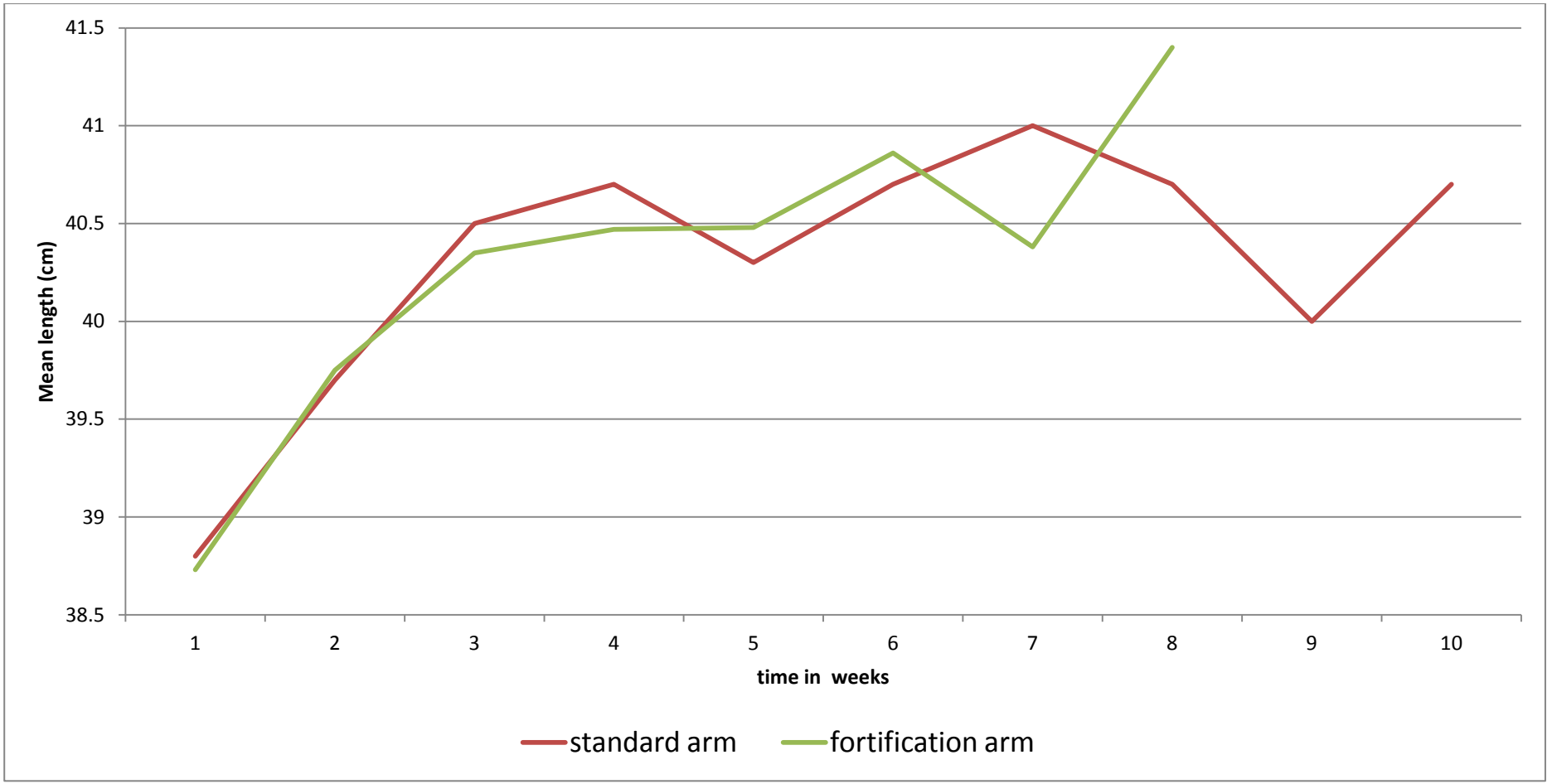
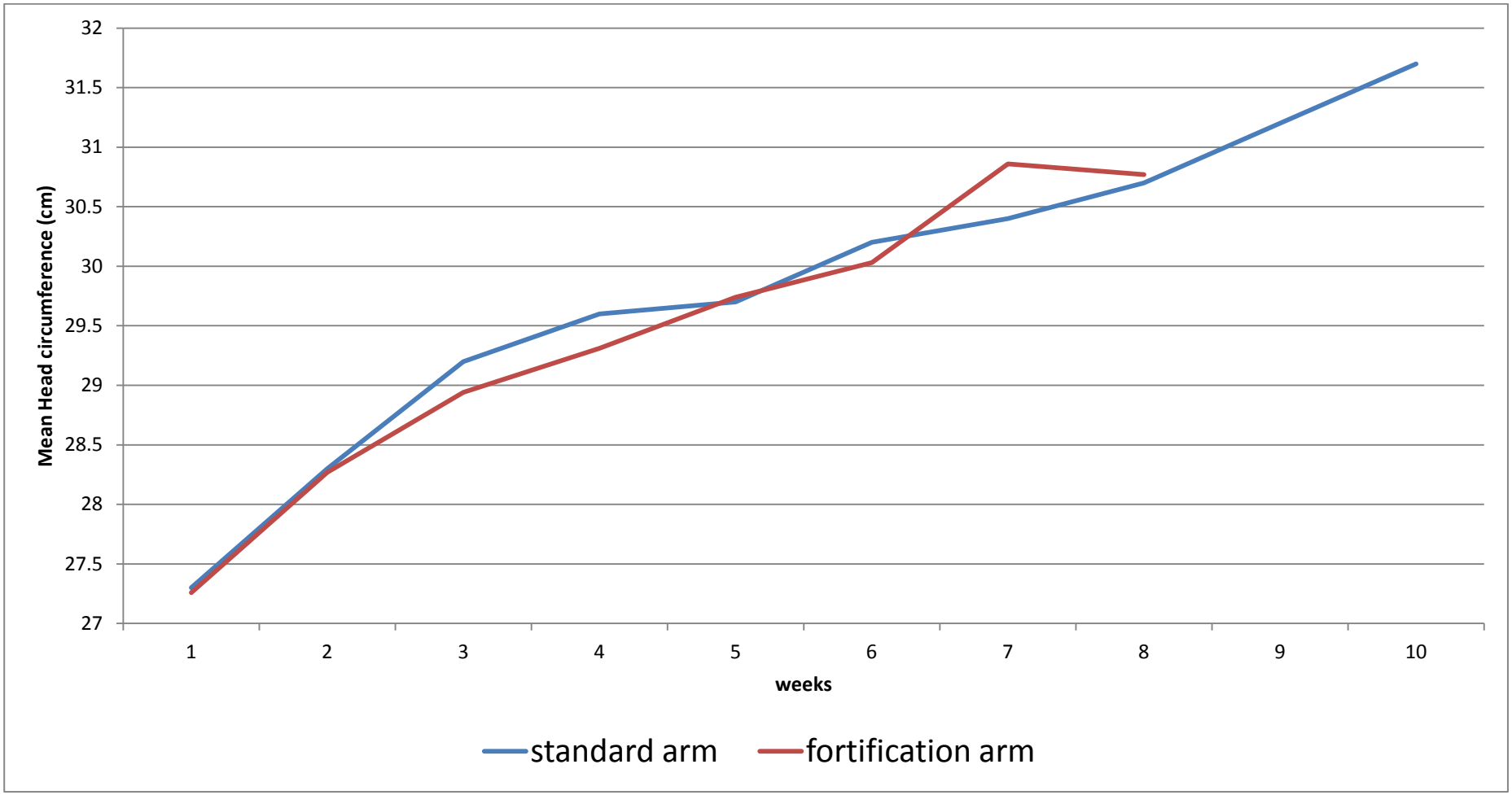


Figure 5: Mean weekly head circumference of babies in both the groups



Secondary outcome variable:

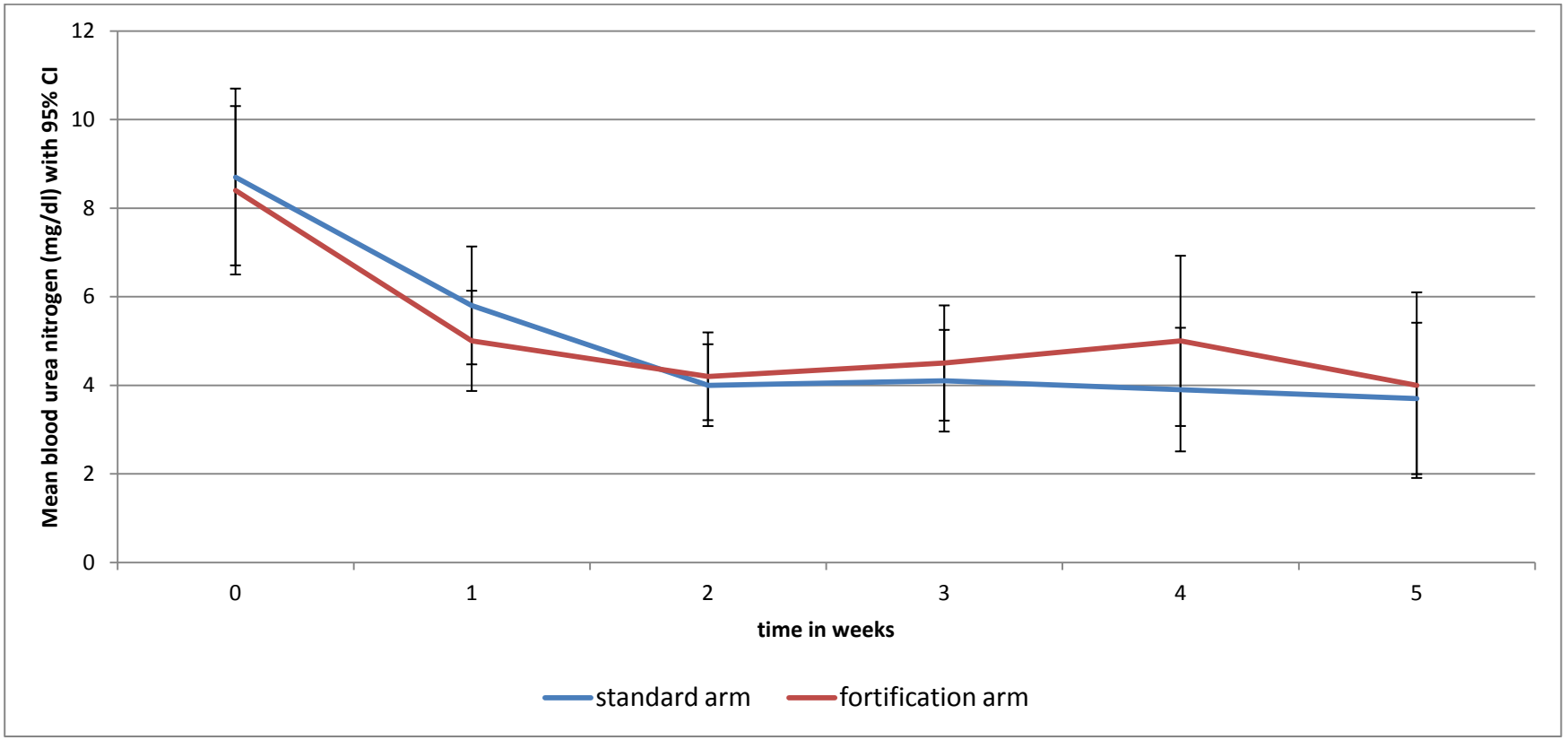
The overall linear growth (length gain in cm /week 0.96±0.23 cm vs 1.04±0.21cm; p=0.016) showed significant improvement in the fortification arm (Table 10 & figure 4). The linear growth remained significantly better in the fortified arm in the subgroup analysis for babies with birth weight <1250g (0.91+0.18 vs 1.02 +0.13; p=0.01) but not for birth weight >1250g (0.99±0.27 vs 1.06 ±0.25; p = 0.23). The head circumference growth in fortification arm (head circumference gain in cm/ week (0.92±0.2 cm vs 0.97±0.2 cm: p= 0.122) though showing an improved trend, was not statistically significant. The results did not change even on sub group analysis of birth weight (Table 10, figure 5).

Table 11: Secondary outcomes: Clinical and biochemical parameters between the two groups

	Standard(N = 73)	Fortification(N = 75)	
	n(%)/mean ±SD	**n(%)/mean ±SD**	**P value**
Sepsis	2(2.7)	6(8.0)	0.28
Feed intolerance	2(2.7)	4(5.3)	0.68
Duration of stay (days)	38.1±13.9	34.75±12.1	0.12
Albumin (g/dl)	2.8±0.4	2.9±0.4	0.68
Prealbumin (g/dl)	10.4±3.7	11.7±4.3	0.05
Hypoalbuminemia < 2 g/dl	1(1.5)	1(1.4)	1.00
Pre albumin< 10 mg/dl	34(50)	33(47.1)	0.74
Calcium (mg/dl)	9.1±0.7	9.1±0.7	0.82
Phosphorus (mg/dl)	6.2 ±1.4	6.5±1.5	0.18
Alkaline phosphatase IU/l	371.6 ±138.9	333.7±119.4	0.08
Alkaline phosphatase > 420 (IU/l)	51(71.8)	57(79.2)	0.31
Phosphorus <4.5 (mg/dl)	7(9.9)	5(6.9)	0.53
Mean Blood urea nitrogen (mg/dl)	5.4±3.6	5.5±3.7	0.82
Metabolic acidosis	5(6.8)	6(8.0)	0.79

Values expressed as mean ± SD or n(%), p value less than <0.05 considered as significant.

Figure 6: Weekly blood urea nitrogen levels (with 95% CI) between the two arm



Looking at the comorbidities, though feed intolerance (2.7% vs 5.3% p = 0.681) and sepsis (2.7 % vs 8% p = 0.276) were more common in the fortification arm, this was not statistically significant. There was one case of NEC in the fortification arm which was excluded from the trial as per the study protocol.

The other secondary outcome variable (table 11) like serum albumin (2.8 $\pm$ 0.4 g /dl vs 2.9 $\pm$ 0.4, p = 0.683) and serum prealbumin (10.4 $\pm$ 3.7 g/dL vs 11.7 $\pm$ 4.3g/dl**,** p = 0.051) though showing an improving trend in the fortification arm were not statistically significant. The incidence of hypoalbuminemia (serum albumin < 2g/dl) (1.5% vs 1.4%; p= 1) and number of babies with serum prealbumin < 10g/dl (50% vs 47.1%; p = 0.74) were comparable between the two arms. The mean serum levels of calcium, phosphorus, alkaline phosphatase (done at 4 – 6 weeks of age) were similar in the two groups. The number of babies with serum alkaline phosphates > 420 IU /l and serum phosphorus <4.5 mg/dl were comparable between both the groups. The incidence of metabolic acidosis (6.8% vs 8%; p = 0.79) between the two groups, was statistically not significant. The blood urea nitrogen was done weekly to analyse the nitrogen accretion rates, and was comparable between the two groups with the exception of the levels done after a week of randomisation which was significantly higher in the standard arm. This unexpected difference could be because of a single baby having a high value (19.16 mg/dl) in the standard arm. Otherwise mean blood urea nitrogen values were higher in the fortification arm as compared to the standard arm from the 3rd week onwards though this was not statistically significant (Figure 6).

Duration of hospital stay was decreased in the fortification group (38.1 $\pm$ 13.9 days vs 34.8 $\pm$ 12.1, $p = 0.117$) but this was not statistically significant.

Table 12: Other co-morbidities and biochemical parameters between the two groups.

	Standard(N= 73)	Fortification(N= 75)	
Variable	**n(%)/mean±SD**	**n(%)/mean ±SD**	**P value**
Periventricular leucomalacia[£]	5(6.8)	11(14.7)	0.13
Anemia requiring packed cell transfusion[Ψ]	15(20.5)	9(12.0)	0.16
Chronic lung disease[φ]	5(6.8)	7(9.3)	0.58
Intra ventricular hemorahage[ϕ]	27(37.0)	27(35.1)	0.95
• **IVH Grade 1 and 2**	25(34.3)	23(31.1)	
• **IVH Grade 3 and 4**	2(2.7)	4(4.1)	
Retinopathy of prematurity[ж]	4(5.8)	4(5.8)	1.00
Apneic spells[¤]	5(6.8)	12(16.0)	0.08
Hyponatremia[@]	12(60.0)	19(79.2)	0.17
Hypocalcemia [##]	1(1.4)	4(5.8)	0.21
Osteopenia of prematurity [#]	3(4.2)	3(4.2)	1.00

* Values are expressed as n (%) Anemia requiring packed cell transfusion[Ψ] (99),[@]Hyponatremia : < 135 meq/l (98), [##]hypocalcemia: < 7 mg/dl (100), [#]Osteopenia of prematurity(OEP); alkaline phosphatise levels >420IU/l (102)and phosphorus levels <4.5 (101,103) Apnea[¤](106), Chronic lung disease[φ] (107), Intra ventricular hemorrahge[ϕ] (108), Periventricular leucomalacia[£] (108), Retinopathy of prematurity[ж] (109).

Looking at the other morbidities (table 12), there was no difference between the two groups with respect to apneic spells (6.8% vs 16%; p = 0.08), intraventricular haemorrhage (IVH)(37% vs 35.1%; p= 0.9), periventricular leucomalacia (PVL) (6.8% vs 14.7%; p= 0.13), chronic lung disease (CLD)(6.8% vs 9.3%; p = 0.58), retinopathy of prematurity (ROP)(5.8% vs 5.8%; p = 1) and anemia requiring packed cell transfusion (20.5%vs 12 %; p = 0.16). Though the incidence of hyponatremia (60% vs 79.2% ; p = 0.17) and hypocalcemia (1.4% vs 5.8%; p = 0.21) post randomisation was more among the fortification arm as compared to standard arm, this was not statistically significant.

The cost of fortifying with lactodex HMF was compared to cost of fortifying with milk powder. The average cost for fortifying each baby's milk would work out to be Rs 180 approximately for milk powder (Rs 125 for each 200g can) as compared to Rs 2000 approximately for lactodex HMF (Rs 15 for each 2g sachet). This was based on assumption of fortifying mean $\pm$ SD of 6945.9 $\pm$ 2345.6 ml of milk in the fortification arm required by each baby.

DISCUSSION:

Preterm VLBW babies require higher protein, minerals and vitamins for achieving adequate growth velocity, and feeding exclusive human milk may not be sufficient. Optimizing nutrition for VLBW preterm babies helps to achieve the target growth velocity comparable to intra uterine growth rate standards of > 15 g/kg/day. Hence fortification of human milk for preterm feeding has become a standard of care. Though there are multiple options available across the world, this is not so in middle income countries like India.

MONITORING GROWTH AND ITS IMPORTANCE IN PRETERM VLBW BABIES

Monitoring growth in preterm VLBW babies requires serial measurement of certain anthropometric variables like weight, length and head circumference (110). Increase in these anthropometric measures signify overall body growth including the brain and is an indicator of optimal nutrition (protein intake) and is associated with improved neurocognitive outcome on long term follow up. (43,110) Linear growth is a better indicator of lean body mass growth rather than weight alone (38,111).

Monitoring of weight gain pattern is considered a traditional metric of growth in preterm newborns. It represents the fine balance between the total energy intake and

the total energy expenditure. Post natal weight gain velocity of 15 – 18 g/kg/day is considered ideal as it is comparable to intrauterine growth rate of fetus during the 2nd and 3rd trimester of pregnancy. The growth velocities may be higher ranging from 20 – 30 g/kg/day for extremely low birth weight babies (112).

Monitoring of head circumference correlates well with the brain volume and its growth (113). Head circumference velocity of 1cm/ week is targeted for preterm VLBW babies which corresponds to head growth during the 3rd trimester. Poor head growth in the postnatal period is one of the important indices of poor neurodevelopment outcomes (114,115).

Serial monitoring of length (linear growth) is closely associated with protein accretion and lean body mass growth (116). Postnatal linear growth velocity of 1cm / week is ideal for preterm VLBW babies as it corresponds to intrauterine growth standards (117). Like weight gain, and head circumference, poor linear growth is also associated with worse neurocognitive outcomes and hence monitoring length in preterm babies is an important biomarker for future neurodevelopment (38).

COMPARISON OF GROWTH PARAMETERS

The use of infant milk powder in our study resulted in significantly improved weight gain pattern (18 ± 2.9 g/kg/day vs 16.1 ±2.9 g/kg/day; p = < 0.001), and linear growth pattern (1.04 ± 0.21 cm / week vs 1.0 ± 0.2 cm /week ; p= 0.02). Head growth circumference (0.97 ±0.19 cm / week vs 0.9 ±0.2 cm / week; p=0.12) was also better in the fortified group, though not statistically significant. The weight gain velocity remained significantly better in the fortification arm even on subgroup analysis (weight gain velocity for <1250g: 15.7±2.7g/kg/day vs 17.1±2.5; p=0.03) and weight gain velocity for >1250g: 16.38±3.1g/kg/day vs18.72±3.0; p=0.001) when compared to standard arm suggesting its beneficial effect even on smaller babies. The linear growth remained significantly better in babies < 1250g on the subgroup analysis when compared to standard arm (0.91±0.18 vs 1.02 ±0.13; p = 0.01) but not so for babies with birth weight >1250g (0.99±0.27 vs 1.06 ±0.25; p = 0.23)

The growth rate after fortification in our study was more or less comparable to the meta-analysis (Cochrane review) done by Kuschel et al which showed improved weight gain, linear growth and head circumference growth with the use of standard multi-component fortification of human milk when compared to use of unfortified human milk in preterm babies. The weight gain pattern ranged from 15.1 ± 3.3 g/kg/day to 20.5 ± 2.3 g/kg/day in the fortified group as compared to 13.2± 6.4 to 16.8 ± 6.4 g/kg/day among the control/ unfortified group (63). The length gain pattern ranged from 0.86 ± 0.23 cm/week to 1.27 ± 0.48 cm/week in the fortification group as

compared to 0.77 ± 0.24 to 0.96 ± 0.41cm /week in the unfortified milk. Head circumference gain pattern 0.84 ± 0.14 to 1.1 ±0.13 cm /week in the fortification group vs 0.7 ± 0.36 to 1 ± 0.19 cm / week in the unfortified milk group(63).

Khorana et al (90) compared the fortification of human milk with HMF vs post discharge formula, where they found no difference in the growth parameters between the two suggesting non inferiority, when using post discharge formula for human milk fortification in low resource settings.

The only Indian study on human milk fortification by Mukhopadhyay et al (30) used Lactodex HMF and showed significantly improved weight gain (15.1 vs 12.9 g/kg/d, P <0.001), linear growth (1.04 vs 0.86 cm/week, P = 0.017) and head circumference increase (0.83 vs 0.75 cm/week, P<0.001). The improvement in the weight gain (16 g/Kg/d vs 12.9 g/kg/d, P = 0.002) and linear growth (1.09 cm/week vs 0.92 cm/week, P = 0.042) was more pronounced in the SGA subgroup. Among the AGA group only the linear growth (1 cm vs 0.82 cm ; P = 0.006) was found to be significant. The growth rate seen in our study was much better (18.03g/kg/day vs 15.1 g/kg/day) in both the arms as compared to the study done by Mukhopadhyay et al (30). The possible reason of this could be that feeds graded upto 200-250 ml/kg/day if the baby tolerates this.

Kumar et al (89) demonstrated beneficial effect of protein supplementation on growth of preterm VLBW babies. The use of lyophilized human milk protein or casein

hydrolysate resulted in average increase in weight gain of 3.6 g/kg/day, increase in length of 0.28cm /week (weighted mean difference) and head circumference growth difference of 0.15 cm/week (weighted mean difference). As growing preterm babies do require extra calcium, phosphorus, minerals and vitamins along with proteins when on exclusive breast milk, this strategy gave way for multi- component fortification. Though most studies done across the world showed definite advantage of multi-component fortification, there is wide heterogenicity among the different fortifiers available and the strategies for milk fortifications. In India however, not many options are available.

Arslanoglu et al (84) showed significantly improved weight gain (18 g/k/d vs 14 g/k/d p = <0.01) and head growth (1.0 cm/week vs 0.7 cm/week ; P<0.05) by using adjustable fortification as compared to standard fortification of human milk. The anthropometric parameters attained by adjustable fortification were almost similar to what we attained in our study.

FORTIFICATION WITH PROTEINS ONLY

Fortification with HMF is proved to increase growth but is not always available in resource limited settings. As human milk analysis may not be possible in most of the NICUs, and protein deficiency is a important factor in growth limitation, Hay et al (118) suggested using 1g/dl of protein supplements to human milk in preterm VLBW babies when the growth velocity is < 15g/kg/day. The beneficial effect of fortification on growth is attributed much to the protein content of the formula rather than energy (47).

The linear relationship between the total protein intake, nitrogen retention and growth especially lean body mass has also been reported by Kashyap et al(119). Even small deficit in protein supply can impair the growth though some excess protein has not shown any detrimental effects in preterms (59). This has also been demonstrated by Miller et al with improved weight using higher protein containing HMF (0.27/g) as compared to HMF with lower protein concentration (0.2/g) (120).

Moya and collegues (121) demonstrated significantly higher final weight, length, head circumference, and linear growth rate using milk fortified with liquid human milk fortifier containing higher protein concentration (3.2g/dl) as compared to milk fortified with powdered milk fortifier containing lower protein concentration (2.6 g/dl) though there was not much difference in the daily weight gain pattern.

The Lactodex HMF available in India has a lower protein content (0.1/g) which is similar to the protein content of the formula milk powder we used (0.125/g). Both of these provide about 2.2 – 2.4 g protein/100 kcal which still remains below the recommended levels of 3.2 to 4.1 g/100 kcal (59). HIJAM milk fortifier recently introduced in the Indian market seems promising providing 3.2 – 3.7g protein/100 kcal though no trials with respect to safety and efficacy of this product have been published.

SERUM ALBUMIN AND PREALBUMIN CONCENTRATIONS

Daily proteins intake of 3 .5 – 4.5 gm/kg/day has been recommended for optimal growth (59) and to achieve acceptable plasma albumin and pre albumin concentration (59). Measurement of serum albumin and serum prealbumin were considered as a biochemical index of protein adequacy whereas elevated blood urea nitrogen concentration and acid base status (metabolic acidosis) may correlate to protein excess as was suggested by Kashyap et al (52).

In a study by Kashyap et al(119) infants fed term human milk were not able to maintain the normal plasma albumin (3.25g/dl) and prealbumin levels(10mg/dl) due to poor daily protein intake. In our study, fortification with infant milk formula resulted in increased serum levels of serum albumin (2.8 $\pm$ 0.4 g/dl vs 2.9 $\pm$ 0.4 g/dl; p=0.68) as compared to unfortified milk but this was not statistically significant but the study

was not powered to look for this. Similarly fortification with infant milk powder resulted in increased levels of serum prealbumin (10.4 ± 3.7 g/dL vs 11.7± 4.3 g/dL ; p=0.05) among the fortified group as compared to standard arm which was of borderline statistical significance. There was no difference between the two groups with respect to babies with hypoalbuminemia (serum albumin < 2 g/dL) and decreased pre albumin levels (< 10 g/dl) in our study (table 11).

Kashyap et al (119) demonstrated a significantly higher serum albumin and prealbumin levels in babies fed milk fortified with protein supplements providing extra protein of 1.2g/kg/day. Similarly Moya et al (121) were able to demonstrate improved serum albumin and prealbumin levels in preterm babies fed higher protein fortifier (liquid HMF) as compared to fortifier containing lower protein concentration (powdered HMF).

BLOOD UREA NITROGEN

Blood urea nitrogen is a readily available test in most laboratories and is known to be a surrogate marker for adequate protein nutrition in presence of normal renal function and adequate hydration (56). It was measured every week from the day of randomization till the endpoint of our study to assess the metabolic response of protein intake. Blood urea nitrogen of < 4 mg/dL is considered as an indicator of protein under nutrition and levels > 20 mg/dl were taken as upper limits of normal.

Though babies who receive protein intake of 3.5 – 4 g/kg/day have higher blood urea nitrogen levels and plasma amino acid concentration, they rarely go beyond 10mg/dl (122).

In the adjustable regimen of fortification, protein intake is increased targeting safe blood urea nitrogen level, between 9 – 14 mg/dL so as to optimize the maximum safe protein intake to avoid under and over nutrition (84) . Moya et al (121) were able to demonstrate higher blood urea nitrogen levels in a group receiving fortifier with higher protein concentration. However, fortification in our study did not have much effect on the mean blood urea nitrogen (except in first week after randomization where mean BUN in control group was higher as compared to fortification group). The significant difference in the BUN during the 1st week was because of a single high value of 19.16 mg/dl in one of the babies in the control arm that caused deviation of the mean value (Table 11). Other than this all weekly BUN levels were slightly higher in the fortification groups as compared to the standard group as was demonstrated by Moya et al (121). However, the weekly mean Blood urea nitrogen in both groups were well below 9 mg/ dl reflecting some amount of protein under nutrition (figure 6).

METABOLIC ACIDOSIS

There was initial concern of increasing incidence of metabolic acidosis with increase in the daily protein intake. Lucas et al (123) showed significant fall in pH (pH 7.33 vs. pH 7.34; weighted mean difference -0.01) in infants receiving a human milk fortifier as compared to controls (unfortified group) though the clinical significance of this is unclear.

Thoene et al reported increased metabolic acidosis with acidified liquid HMF (77) as compared to powdered fortifier which was statistically significant. There was no significant metabolic acidosis among the two groups (6.8%vs 8% ; p = 0.8) in our study.

CALCIUM, PHOSPHORUS AND ALKALINE PHOSPHATASE LEVELS

Similar to our study, several studies have shown that fortification with infant formula do not have effect on calcium, phosphorus and alkaline phosphates done at 4 – 6 weeks of age or on the incidence of hyponatremia, and hypocalcemia (30). However, Kashyap et al (119) demonstarted improved calcium and phosphorus accretion in babies receiving fortified human milk as compared to unfortified milk .

Alkaline phosphatase activity correlates well with increased osteoblastic activity and rate of growth. Alkaline phosphate level < 450 IU/l is desired in growing preterm VLBW babies as suggested by by Hall et al(124). We have considered alkaline phosphates level > 420 IU/l to be abnormal in preterm babies (102). The mean alkaline phosphatase levels though increased in the unfortified arm was not significant as compared the fortified arm in our study (371.6 $\pm$ 138.9 IU vs 333.7 $\pm$ 119.4 IU ; p = 0.08). Though the number of infants with alkaline phosphatase levels >420 IU/l and serum phosphorus levels < 4.5 mg / dl was higher among the control group as compared to fortified group this was not statistically significant. (Table 11).

Feeding un-supplemented human milk has been shown by Abrams et al (125)to significantly decrease serum phosphorus levels (p < 0.03) and increase alkaline phosphates activity (p < 0.01) on follow up when compared to infants fed commercial formula.

Pettifor et al(126) demonstrated significantly lower alkaline phosphates activity, and improved bone mineralisation in very low birth weight infants fed fortified human milk, when compared to infants fed exclusive human milk. These initial biochemical bone indices and bone mineral content were no different among the two groups at 3 months follow up when both groups received exclusive breast feeding after discharge in this study.

Kuschel et al (63) also did not found any significant difference in the mean alkaline phosphatase activity (weighted mean difference 0.2IU/l CI -34.0 - 34.4IU/l) among the infants fed fortified and unfortified human milk.

FEED INTOLERANCE:

Addition of any fortifying agent (powder or liquid) to the human milk may alter its osmolality (increase from 302 miliosmol/kg to 392 miliosmol/kg on addition of fortifying agent.) as described by Aggarwal et al (127). Increased osmolality of fortified human milk has raised the concern of feed intolerance and NEC. The American academy of pediatrics (AAP) (128) has recommended the upper limit of osmolality to be 450 miliosmol /kg. Standard fortification of human milk may affect the incidence of non acid GER and feeding intolerance by increasing the osmolality (129). Increased osmolality beyond the recommended levels (> 450 miliosmol /kg) may delay the gastric emptying time and hence the feeding intolerance (130).

The addition of infant milk powder increased the osmolality from the baseline of 303 miliosmol/ kg to 397 miliosmol /kg in our study. Feeding intolerance was more common in the fortification group in our study though it was not statistically significant (2 (2.7%) vs 4 (5.3%) p = 0.68). Feed intolerance associated with fortification may be associated with temporary delay in gastric emptying as was demonstrated by Ewer et al (131).

Moody et al (132) showed the significantly increased incidence of emesis and increased gastric residual volume (> 2ml/kg) after fortifications of feeds, but there was no significant difference with respect to abdominal distension, bile stained gastric residuals, blood in stools, feeds withheld, apneic and bradycardiac spells and number of abdominal radiographs taken between the two groups i.e before and after fortification. This was in contradiction to what Mukhopadhyay et al (30) demonstrated in which the feeing intolerance increased in the standard arm which could not be explained.

REFLUX AND APNEA AFTER FORTIFICATION;

The standard fortification of human milk may cross the recommended osmolality which in turn may influence the non acid gastro esophageal reflux and feeding tolerance of premature baby (129). Though the number of apnea episodes post randomization were more in the fortification group, this was not statistically significant (5 (6.8%) vs 12 (16%); p=0.08). Moody et al (132) also found no significant differences in mean (± SEM) apneic/ bradycardiac spells (4.8 + 0.83 vs 4.5 ± 0.71; p = 0.78) 5 days before and after the fortification with HMF.

NECROTISING ENTEROCOLITIS

Though bovine milk protein based fortifiers improves the growth of preterm low birth weight babies, the use of bovine protein may be an independent risk factor of NEC in vulnerable infants (15, 56). Sullivan et al (15) demonstrated significant difference for combined outcome of NEC or death in infants fed bovine milk based HMF (BOV) as compared to those fed exclusive human milk based fortifiers like HMF 40 and HMF 100)(HMF 100 (6%), HMF40 (8.5%), and BOV (20%), P = .02) (89). HMF 60 and HMF 100 denotes human milk fortification done once the infant reaches feeding volume of 60 and 100 ml/kg/day. The number needed to treat (NNT) to prevent 1 case of NEC or 1 case of death/ surgical NEC with the use of all human milk based feeding protocol (human milk based fortifiers with preterm human milk) was 10 and 8 respectively(15).

Thoene at al (77) reported increased incidence of NEC when using High protein containing (3.2 g %) acidified liquid milk fortifier as compared to low protein (2.3%) powdered milk fortifier (13% vs. 0%, p=0.03).

Lucas et al (123) also reported increased incidence of NEC in the fortified group (5.8% vs 2.2%, P = 0.12) though there was significant use of preterm formulas in both groups.

A Cochrane review in 2004 (including 7 trials and 640 infants to look for NEC as outcome) (63) refuted the claim of increased incidence of NEC in fortified human milk when compared to unfortified human milk in preterm infants (relative risk 1.33, 95% CI 0.7-2.5). In this meta- analysis, though the results were not statistically significant, number of trials showed an increased trend towards NEC with fortification. In our study there was only one case of NEC in the fortification group which was noted on the 7th day of fortification and was excluded from the analysis as per the study protocol.

SEPSIS AND BACTEREMIA

In view increased risk of bacterial contamination resulting in increased neonatal sepsis, Centers for Disease Control and prevention do not recommend powder formulas and powdered human milk fortifiers for use in preterm infants(75,76). Lucas et al also (123) reported higher incidence of clinical infection in the fortification group (43% vs 31%, P = 0.04). The acidified liquid HMF with higher protein content was introduced to address these concerns, but it was also not without limitations and recent studies have expressed their concerns with use of liquid HMF for poor growth and increased metabolic acidosis (77).

In our study also though there was increased incidence of sepsis (Probable and or Blood culture positive sepsis) in the fortification group, this was not statistically

significant. 2 (2.7%) vs 6 (8%) ; p =0.28). There were 3 cases of blood culture positive cases among the fortification arm and none in the standard arm.(4% vs 0% ; p = 0.25).

DURATION OF STAY:

Though there was decreased duration of stay in the fortification group as compared to standard group (38.1±13.9 vs 34.7 ± 12.0 days; p =0.12) this was not statistically significant in our study. Mukhopadhyay et al (30) did not find any significant decrease in mean duration of hospital stay (31.9 ± 16.2 days vs 29.4 ± 13.2 days ; p = 0.27) for fortified group when compared to unfortified group.

Bhat et al (133) reported significantly shorter duration of hospital stay (< 45 days) for majority of premature very low birth weight babies (94% vs 66%; p < 0.01)who received fortified milk as compared to babies receiving unfortified human milk.

OTHER MORBIDITIES

There was no significant difference in incidence of intraventricular hemorrhage (IVH), chronic lung disease (CLD), retinopathy of prematurity (ROP) and infants requiring packed cell transfusion for anemia in our study. Lucas et al(123) did not find significant difference with respect to incidence of IVH (15.3% vs 15.2%) when

compared to infant feeding with fortified human milk and unfortified human milk. Mukhopadhyay et al (30) also showed no difference between the two groups with respect to the incidence of IVH (20.7% vs 14.7%; p= 0.32) but there was significant increase in CLD in the fortification group (11% vs 2.7%; p = 0.036) the reason of which was not clear.

Hanson et al (134) found significantly decreased incidence of chronic lung disease (p = 0.02) in very low birth weight infants after implementing intensive nutritional practices (which includes early and aggressive total parenteral nutrition (TPN), early minimal enteral nutrition (MEN), early enteral feedings, feeding administration, protein fortification of human milk, and implementing a "feeding intolerance algorithm" in practice.)

Miller et al(120) in his study did not found any difference with respect to incidence of retinopathy of prematurity (30% vs 31%; p = 0.96) and babies requiring oxygen at 36 weeks corrected age (47% vs 35%; p = 0.19) while using HMF with variable protein concentration (0.27/g and 0.2/g) for infant feeding

COST EFFECTIVE ANALYSIS

The use of Infant milk powder as HMF significantly reduced the financial burden for each baby during the nursery stay (average of Rs 180 for infant formulae powder as compared to Rs 2000 from HMF). Khorana et al (90) also demonstrated similar reduction in expenditure by 19 times while using post discharge formula for human milk fortification when compared to commercial fortifiers.

There was significant reduction in the mean total EBM used in the fortification arm as compared to the standard arm (7745.1$\pm$2823.9 ml vs 6845.9$\pm$2354.6ml; p=0.037) during the trial period though achieving better growth rates in former. The duration of stay also reduced by mean of 3- 4 days in the fortification arm (38.1 $\pm$ 13.9 days vs 34.8 $\pm$ 12.1, p = 0.117) though results were not statistically significant.

SUMMARY

- Human milk is considered as the best source of nutrition for preterm newborn babies due to its several nutritional and immunologic advantages

- Preterm VLBW babies fed exclusive human milk fail to grow at rates comparable to intrauterine growth rates.

- The cause of growth failure in such infants is due to a physiological decline of proteins and other nutrients with increase with the duration of lactation

- Postnatal growth failure has been shown to increase the risk of long term poor neurodevelopmental and neurocognitive outcome.

- Fortification of human milk to provide optimum nutrition to growing preterm babies is the standard of care across the world.

- Fortification of human milk in developing countries like India is still a challenge in view of limited availability and cost.

- In our study, fortification of human milk with infant milk powder for feeding preterm VLBW babies was shown to improve weight gain pattern and linear growth significantly when compared to unfortified human milk and was

comparable to intrauterine growth standards. It also improved head circumference growth though results were not statistically significant.

- Serum albumin and serum prealbumin which are markers of protein nutrition improved in the fortification groups but results were not statistically significant.

- The other biochemical indicators were not significantly different between the two groups.

- There was no evidence of protein overload in the fortification group as assessed by weekly blood urea nitrogen and blood gases.

- The various co- morbidities like feed intolerance, sepsis and necrotizing enetrocolitis was not increased due to fortification with infant milk formulae. The duration of stay though decreased in the fortification arm, was not statistically significant.

- Our study results of fortification with Infant milk powder with respect to growth parameters (weight gain pattern, linear growth velocity and head growth pattern) where more or less similar to other studies that used several commercially available fortifiers (63).

CONCLUSIONS:

The use of infant milk powder for human milk fortification showed significant improvement in the weight gain velocity and linear growth in preterm VLBW babies when compared with feeding using unfortified human milk. Though there was also improvement in the head growth rate, results were not statistically significant. This improvement was not associated with any adverse effects or difference in the co morbidities. The use of infant milk powder as a human milk fortifier is a practical, feasible and cheaper alternative for improving growth of preterm very low birth weight babies in middle income countries like India.

STRENGTHS OF STUDY

- Trial was adequately powered (90%) and achieved the required sample size. More than 90% could be followed up with < 10% lost to follow up.

- The intervention in the study (i.e fortification of human milk with infant milk powder) was done by nursing staff not involved directly in the study.

- The use of 0.5 g measuring scoop spoon led to homogenous and exact fortification of small milk volumes (12.5ml) as and when required which added to the precision of study.

- All the biochemical analysis in the study were done by NABL accredited labs (in addition to external quality assurance from Biorad, RCP, Australia)

- Measurement of outcome variables (like weight gain, linear growth and head circumference) and statistical analysis were blinded.

- The method of weight gain calculation was robust as it accounted previous day weight to be considered as denominator and calculated the mean birth weight gain for each baby.

- Interim analysis was done every 6 months to monitor for safety of babies enrolled in the trial.

LIMITATIONS OF STUDY:

- Study was not blinded to parents of babies and care givers due to the nature of intervention.

- Though the numbers were small but few babies broke the protocol and were analyzed in the same group (Intention to treat analysis)

- Measuring length was not precise and there could have been intra observer variation.

BIBLIOGRAPHY:

1. Eidelman AI, Schanler RJ, Johnston M, Landers S, Noble L, Szucs K, et al. Breastfeeding and the Use of Human Milk. Pediatrics. 2012 Mar 1;129(3):e827–41

2. Schanler RJ. Evaluation of the evidence to support current recommendations to meet the needs of premature infants: the role of human milk. Am J Clin Nutr. 2007 Feb;85(2):625S – 628S.

3. Bier J-AB, Oliver T, Ferguson AE, Vohr BR. Human milk improves cognitive and motor development of premature infants during infancy. J Hum Lact Off J Int Lact Consult Assoc. 2002 Nov;18(4):361–7.

4. Blaymore Bier J-A, Oliver T, Ferguson A, Vohr BR. Human milk reduces outpatient upper respiratory symptoms in premature infants during their first year of life. J Perinatol Off J Calif Perinat Assoc. 2002 Aug;22(5):354–9.

5. Lucas A, Morley R, Cole TJ. Randomised trial of early diet in preterm babies and later intelligence quotient. BMJ. 1998 Nov 28;317(7171):1481–7.

6. Morales Y, Schanler RJ. Human milk and clinical outcomes in VLBW infants: how compelling is the evidence of benefit? Semin Perinatol. 2007 Apr;31(2):83–8.

7. Meinzen-Derr J, Poindexter B, Wrage L, Morrow AL, Stoll B, Donovan EF. Role of human milk in extremely low birth weight infants' risk of necrotizing

enterocolitis or death. J Perinatol Off J Calif Perinat Assoc. 2009 Jan;29(1):57–62.

8. Hay WW, Lucas A, Heird WC, Ziegler E, Levin E, Grave GD, et al. Workshop summary: nutrition of the extremely low birth weight infant. Pediatrics. 1999 Dec;104(6):1360–8.

9. Gartner LM, Morton J, Lawrence RA, Naylor AJ, O'Hare D, Schanler RJ, et al. Breastfeeding and the use of human milk. Pediatrics. 2005 Feb;115(2):496–506.

10. Furman L, Taylor G, Minich N, Hack M. The effect of maternal milk on neonatal morbidity of very low-birth-weight infants. Arch Pediatr Adolesc Med. 2003 Jan;157(1):66–71.

11. Patel AL, Johnson TJ, Engstrom JL, Fogg LF, Jegier BJ, Bigger HR, et al. Impact of early human milk on sepsis and health-care costs in very low birth weight infants. J Perinatol Off J Calif Perinat Assoc. 2013 Jul;33(7):514–9.

12. Schanler RJ. The use of human milk for premature infants. Pediatr Clin North Am. 2001 Feb;48(1):207–19.

13. Schanler RJ, Shulman RJ, Lau C. Feeding strategies for premature infants: beneficial outcomes of feeding fortified human milk versus preterm formula. Pediatrics. 1999 Jun;103(6 Pt 1):1150–7.

14. Sisk PM, Lovelady CA, Dillard RG, Gruber KJ, O'Shea TM. Early human milk feeding is associated with a lower risk of necrotizing enterocolitis in very

low birth weight infants. J Perinatol Off J Calif Perinat Assoc. 2007 Jul;27(7):428–33.

15. Sullivan S, Schanler RJ, Kim JH, Patel AL, Trawöger R, Kiechl-Kohlendorfer U, et al. An exclusively human milk-based diet is associated with a lower rate of necrotizing enterocolitis than a diet of human milk and bovine milk-based products. J Pediatr. 2010 Apr;156(4):562–7.e1.

16. Saluja S, Modi M, Kaur A, Batra A, Soni A, Garg P, et al. Growth of very low birth-weight Indian infants during hospital stay. Indian Pediatr. 2010 Oct;47(10):851–6.

17. Carlson SJ, Ziegler EE. Nutrient intakes and growth of very low birth weight infants. J Perinatol Off J Calif Perinat Assoc. 1998 Aug;18(4):252–8.

18. Embleton NE, Pang N, Cooke RJ. Postnatal malnutrition and growth retardation: an inevitable consequence of current recommendations in preterm infants? Pediatrics. 2001 Feb;107(2):270–3.

19. Latal-Hajnal B, von Siebenthal K, Kovari H, Bucher HU, Largo RH. Postnatal growth in VLBW infants: significant association with neurodevelopmental outcome. J Pediatr. 2003 Aug;143(2):163–70.

20. Furman L and Schanler RJ. Breastfeeding. In: Gleason CA and Devaskar S editors. Avery's Diseases of the Newborn, 9th Edition. Philadelphia: Elsevier Saunders,publishers 2012. P. 937 - 951.

21. Ehrenkranz RA, Dusick AM, Vohr BR, Wright LL, Wrage LA, Poole WK. Growth in the neonatal intensive care unit influences neurodevelopmental and growth outcomes of extremely low birth weight infants. Pediatrics. 2006 Apr;117(4):1253–61.

22. Atkinson SA, Radde IC, Anderson GH. Macromineral balances in premature infants fed their own mothers' milk or formula. J Pediatr. 1983 Jan;102(1):99–106.

23. Tönz O, Schubiger G. Feeding of very-low-birth-weight infants with breast-milk enriched by energy, nitrogen and minerals: FM85. Helv Paediatr Acta. 1985 Sep;40(4):235–47.

24. Cooper PA, Rothberg AD, Pettifor JM, Bolton KD, Devenhuis S. Growth and biochemical response of premature infants fed pooled preterm milk or special formula. J Pediatr Gastroenterol Nutr. 1984 Nov;3(5):749–54.

25. Klein CJ. Nutrient Requirements For Preterm Infant Formulas. J Nutr. 2002 Jun 1;132(6):1395S – 1577S.

26. Nutrient needs and feeding of premature infants. Nutrition Committee, Canadian Paediatric Society. CMAJ Can Med Assoc J J Assoc Medicale Can. 1995 Jun 1;152(11):1765–85.

27. LACTODEX-HMF Dosage & Drug Information | CIMS India [Internet]. [cited 2014 Sep 20]. Available from:

http://www.mims.com/India/drug/info/LACTODEX-HMF/LACTODEX-HMF%20powd%20for%20oral%20susp

28. Nutritional Supplementation Of LBW Babies : Conference Abstracts [Internet]. [cited 2014 Sep 20]. Available from: http://www.pediatriconcall.com/fordoctor/Conference_abstracts/report.aspx?reportid=268

29. Sankar MJ, Agarwal R, Mishra S, Deorari AK, Paul VK. Feeding of low birth weight infants. Indian J Pediatr. 2008 May;75(5):459–69.

30. Mukhopadhyay K, Narang A, Mahajan R. Effect of human milk fortification in appropriate for gestation and small for gestation preterm babies: a randomized controlled trial. Indian Pediatr. 2007;44(4):286.

31. Chowdhary S. Human milk fortifier vs. formula. Indian Pediatr. 2008 Apr;45(4):333; author reply 333–4.

32. Blencowe H, Cousens S, Oestergaard MZ, Chou D, Moller A-B, Narwal R, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. Lancet. 2012 Jun 9;379(9832):2162–72.

33. Hamilton BE, Hoyert DL, Martin JA, Strobino DM, Guyer B. Annual summary of vital statistics: 2010-2011. Pediatrics. 2013 Mar;131(3):548–58.

34. WHO | Preterm birth [Internet]. WHO. [cited 2015 Jan 25]. Available from: http://www.who.int/mediacentre/factsheets/fs363/en/

35. Basu S, Rathore P, Bhatia BD. Predictors of mortality in very low birth weight neonates in India. Singapore Med J. 2008 Jul;49(7):556–60.

36. Stoll BJ, Hansen NI, Bell EF, Shankaran S, Laptook AR, Walsh MC, et al. Neonatal outcomes of extremely preterm infants from the NICHD Neonatal Research Network. Pediatrics. 2010 Sep;126(3):443–56.

37. Lemons JA, Moye L, Hall D, Simmons M. Differences in the composition of preterm and term human milk during early lactation. Pediatr Res. 1982 Feb;16(2):113–7.

38. Ramel SE, Demerath EW, Gray HL, Younge N, Boys C, Georgieff MK. The relationship of poor linear growth velocity with neonatal illness and two-year neurodevelopment in preterm infants. Neonatology. 2012;102(1):19–24.

39. Can E, Bülbül A, Uslu S, Cömert S, Bolat F, Nuhoğlu A. Effects of aggressive parenteral nutrition on growth and clinical outcome in preterm infants. Pediatr Int Off J Jpn Pediatr Soc. 2012 Dec;54(6):869–74.

40. Stephens BE, Walden RV, Gargus RA, Tucker R, McKinley L, Mance M, et al. First-week protein and energy intakes are associated with 18-month developmental outcomes in extremely low birth weight infants. Pediatrics. 2009 May;123(5):1337–43.

41. Clark RH, Thomas P, Peabody J. Extrauterine growth restriction remains a serious problem in prematurely born neonates. Pediatrics. 2003 May;111(5 Pt 1):986–90.

42. Franz AR, Pohlandt F, Bode H, Mihatsch WA, Sander S, Kron M, et al. Intrauterine, early neonatal, and postdischarge growth and neurodevelopmental outcome at 5.4 years in extremely preterm infants after intensive neonatal nutritional support. Pediatrics. 2009 Jan;123(1):e101–9.

43. Brown LD, Hendrickson K, Masor ML, Hay Jr. WW. High-Protein Formulas: Evidence for Use in Preterm Infants. Clin Perinatol. 2014 Jun;41(2):383–403.

44. Rigo J. Protein, amino acid and other nitrogen compounds. In: Tsang RC, Uauy R, Koletzko B, et al, editors. Nutrition of the preterm infant: scientific basis and practical guidelines. 2nd edition. Cincinnati (OH): Digital Educational Publishing,.

45. Fuglestad A, Rao R, Georgieff M. The role of nutrition in cognitive development. In: Nelson CA, Luciana L, editors. Handbook of developmental cognitive neuroscience. 2nd edition. Cambridge (MA): MIT Press; 2008. p. 623–42.

46. Arslanoglu S, Moro GE, Ziegler EE. Preterm infants fed fortified human milk receive less protein than they need. J Perinatol Off J Calif Perinat Assoc. 2009 Jul;29(7):489–92.

47. Arslanoglu S, Moro GE, Ziegler EE, The Wapm Working Group On Nutrition null. Optimization of human milk fortification for preterm infants: new concepts and recommendations. J Perinat Med. 2010 May;38(3):233–8.

48. Goldman HI, Goldman J, Kaufman I, Liebman OB. Late effects of early dietary protein intake on low-birth-weight infants. J Pediatr. 1974 Dec;85(6):764–9.

49. Halleux V de, Rigo J. Variability in human milk composition: benefit of individualized fortification in very-low-birth-weight infants. Am J Clin Nutr. 2013 Aug 1;98(2):529S – 535S.

50. Senterre T, Rigo J. Optimizing early nutritional support based on recent recommendations in VLBW infants and postnatal growth restriction. J Pediatr Gastroenterol Nutr. 2011 Nov;53(5):536–42.

51. Isaacs EB, Gadian DG, Sabatini S, Chong WK, Quinn BT, Fischl BR, et al. The effect of early human diet on caudate volumes and IQ. Pediatr Res. 2008 Mar;63(3):308–14.

52. Kashyap S, Forsyth M, Zucker C, Ramakrishnan R, Dell RB, Heird WC. Effects of varying protein and energy intakes on growth and metabolic response in low birth weight infants. J Pediatr. 1986 Jun;108(6):955–63.

53. Cooke R, Embleton N, Rigo J, Carrie A, Haschke F, Ziegler E. High protein pre-term infant formula: effect on nutrient balance, metabolic status and growth. Pediatr Res. 2006 Feb;59(2):265–70.

54. Kashyap S, Towers HM, Sahni R, Ohira-Kist K, Abildskov K, Schulze KF. Effects of quality of energy on substrate oxidation in enterally fed, low-birth-weight infants. Am J Clin Nutr. 2001 Sep;74(3):374–80.

55. Kashyap S, Ohira-Kist K, Abildskov K, Towers HM, Sahni R, Ramakrishnan R, et al. Effects of quality of energy intake on growth and metabolic response of enterally fed low-birth-weight infants. Pediatr Res. 2001 Sep;50(3):390–7.

56. Adamkin DH, Radmacher PG. Fortification of Human Milk in Very Low Birth Weight Infants (VLBW <1500 g Birth Weight). Clin Perinatol. 2014 Jun;41(2):405–21.

57. Tsang R, uauy R, Koletzko B, Zlotkin S: Nutrition of the preterm Infant. Scientific Basis and Practical application, ed2. Cincinnati, Digital Educ Publ, 2005.

58. Ziegler EE, Thureen PJ, Carlson SJ. Aggressive nutrition of the very low birthweight infant. Clin Perinatol. 2002 Jun;29(2):225–44.

59. Agostoni C, Buonocore G, Carnielli VP, De Curtis M, Darmaun D, Decsi T, et al. Enteral nutrient supply for preterm infants: commentary from the European Society of Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition. J Pediatr Gastroenterol Nutr. 2010 Jan;50(1):85–91.

60. American Academy of Pediatrics Committee on Nutrition. Nutritional needs of preterm infants. In: Kleinman RE, editor. Pediatric nutrition handbook American Academy of Pediatrics. 1st edition. Elk Grove Village (IL): American Academy of Pediatrics; 2013. p. 23–54.

61. Hawthorne KM, Abrams SA. Safety and efficacy of human milk fortification for very-low-birthweight infants. Nutr Rev. 2004 Dec;62(12):482–5.

62. Maggio L, Costa S, Gallini F. Human milk fortifiers in very low birth weight infants. Early Hum Dev. 2009 Oct;85(10 Suppl):S59–61.

63. Kuschel CA, Harding JE. Multicomponent fortified human milk for promoting growth in preterm infants. Cochrane Database Syst Rev. 2004;(1):CD000343.

64. Rochow N, Fusch G, Choi A, Chessell L, Elliott L, McDonald K, et al. Target Fortification of Breast Milk with Fat, Protein, and Carbohydrates for Preterm Infants. J Pediatr. 2013 Oct;163(4):1001–7.

65. Kreissl A, Zwiauer V, Repa A, Binder C, Haninger N, Jilma B, et al. Effect of fortifiers and additional protein on the osmolarity of human milk: is it still safe for the premature infant? J Pediatr Gastroenterol Nutr. 2013 Oct;57(4):432–7.

66. Enfamil Human Milk Fortifier Acidified Liquid | Mead Johnson Healthcare Professional Resource Center [Internet]. [cited 2015 Feb 12]. Available from: http://www.meadjohnson.com/pediatrics/us-en/product-information/products/newborns/enfamil-human-milk-fortifier-acidified-liquid#indication

67. Similac® Human Milk Fortifier Concentrated Liquid [Internet]. [cited 2014 Sep 21]. Available from: http://abbottnutrition.com/brands/products/similac-human-milk-fortifier-concentrated-liquid

68. Fewtrell M, Chomtho S, Lucas a. Feeding Low- Birthweight Infants. in: Rennie Jm, Editor. Rennie and Roberton's Textbook of Neonatology, 5th Edition. London (uk):churchill Livingstone: Elsevier,publishers 2012. P. 309- 320.

69. Henriksen C, Westerberg AC, Rønnestad A, Nakstad B, Veierød MB, Drevon CA, et al. Growth and nutrient intake among very-low-birth-weight infants fed fortified human milk during hospitalisation. Br J Nutr. 2009 Oct;102(8):1179–86.

70. Pieltain C, De Curtis M, Gérard P, Rigo J. Weight gain composition in preterm infants with dual energy X-ray absorptiometry. Pediatr Res. 2001 Jan;49(1):120–4.

71. Hair AB, Blanco CL, Moreira AG, Hawthorne KM, Lee ML, Rechtman DJ, et al. Randomized Trial of Human Milk Cream as a Supplement to Standard Fortification of an Exclusive Human Milk-Based Diet in Infants 750-1250 g Birth Weight. J Pediatr. 2014 Nov;165(5):915–20.

72. Herrmann K, Carroll K. An exclusively human milk diet reduces necrotizing enterocolitis. Breastfeed Med Off J Acad Breastfeed Med. 2014 May;9(4):184–90.

73. Ganapathy V, Hay JW, Kim JH. Costs of necrotizing enterocolitis and cost-effectiveness of exclusively human milk-based products in feeding extremely premature infants. Breastfeed Med Off J Acad Breastfeed Med. 2012 Feb;7(1):29–37.

74. Hair AB, Hawthorne KM, Chetta KE, Abrams SA. Human milk feeding supports adequate growth in infants <= 1250 grams birth weight. BMC Res Notes. 2013 Nov 13;6:459.

75. Baker RD. Infant formula safety. Pediatrics. 2002 Oct;110(4):833–5.

76. Steele C, Kinzler S. Microbiology and infection control. In: Robbins ST, Meyers R, editors. Infant feedings: guidelines for preparation of human milk and formula in health care facilities. 2nd edition. Chicago: Diana Faulhaber; 2011. p. 108–21.

77. Thoene M, Hanson C, Lyden E, Dugick L, Ruybal L, Anderson-Berry A. Comparison of the effect of two human milk fortifiers on clinical outcomes in premature infants. Nutrients. 2014 Jan;6(1):261–75.

78. Polberger S. New approaches to optimizing early diets. Nestlé Nutr Workshop Ser Paediatr Programme. 2009;63:195–204; discussion 204–8, 259–68.

79. Lönnerdal B. Personalizing nutrient intakes of formula-fed infants: breast milk as a model. Nestlé Nutr Workshop Ser Paediatr Programme. 2008;62:189–98; discussion 198–203.

80. Radmacher PG, Lewis SL, Adamkin DH. Individualizing fortification of human milk using real time human milk analysis. J Neonatal-Perinat Med. 2013 Jan 1;6(4):319–23.

81. Ziegler EE. Breast-milk fortification. Acta Paediatr Oslo Nor 1992. 2001 Jul;90(7):720–3.

82. Di Natale C, Coclite E, Di Ventura L, Di Fabio S. Fortification of maternal milk for preterm infants. J Matern-Fetal Neonatal Med Off J Eur Assoc Perinat

Med Fed Asia Ocean Perinat Soc Int Soc Perinat Obstet. 2011 Oct;24 Suppl 1:41–3.

83. Polberger S, Raiha NC, Juvonen P, Moro GE, Minoli I, Warm A. Individualized Protein Fortification of Human Milk for Preterm Infants: Comparison of Ultrafiltrated Human Milk Protein and a Bovine Whey Fortifier. J Pediatr Gastroenterol. 1999;29(3):332–8.

84. Arslanoglu S, Moro GE, Ziegler EE. Adjustable fortification of human milk fed to preterm infants: does it make a difference? J Perinatol. 2006 Aug 3;26(10):614–21.

85. Arslanoglu S, Bertino E, Coscia A, Tonetto P, Giuliani F, Moro GE. Update of adjustable fortification regimen for preterm infants: a new protocol. J Biol Regul Homeost Agents. 2012 Sep;26(3 Suppl):65–7.

86. Ridout E, Melara D, Rottinghaus S, Thureen PJ. Blood urea nitrogen concentration as a marker of amino-acid intolerance in neonates with birthweight less than 1250 g. J Perinatol Off J Calif Perinat Assoc. 2005 Feb;25(2):130–3.

87. Roggero P, Giannì ML, Morlacchi L, Piemontese P, Liotto N, Taroni F, et al. Blood urea nitrogen concentrations in low-birth-weight preterm infants during parenteral and enteral nutrition. J Pediatr Gastroenterol Nutr. 2010 Aug;51(2):213–5.

88. Human Milk Fortification in India.pdf [Internet]. [cited 2015 Feb 15]. Available from: http://www.nestlenutrition-institute.org/resources/library/Free/workshop/NNIW81/Documents/Human%20Milk%20Fortification%20in%20India.pdf

89. Kumar P and Sundaram V. Protein supplementation of human milk for promoting growth in preterm infants : RHL commentary (last revised: 1 July 2011). The WHO Reproductive Health Library; Geneva: World Health Organization. Available from: http://www.who.int/rhl/newborn/cd000433_kumarp_com/en/.

90. Khorana M, Jiamsajjamongkhon C. Pilot study on growth parameters and nutritional biochemical markers in very low birth weight preterm infants fed human milk fortified with either human milk fortifier or post discharge formula. J Med Assoc Thail Chotmaihet Thangphaet. 2014 Jun;97 Suppl 6:S164–75.

91. Zuckerman M, Pettifor JM. Rickets in very-low-birth-weight infants born at Baragwanath Hospital. South Afr Med J Suid-Afr Tydskr Vir Geneeskd. 1994 Apr;84(4):216–20.

92. Olsen IE, Groveman SA, Lawson ML, Clark RH, Zemel BS. New intrauterine growth curves based on United States data. Pediatrics. 2010 Feb;125(2):e214–24.

93. Lucchini R, Bizzarri B, Giampietro S, De Curtis M. Feeding intolerance in preterm infants. How to understand the warning signs. J Matern-Fetal Neonatal

Med Off J Eur Assoc Perinat Med Fed Asia Ocean Perinat Soc Int Soc Perinat Obstet. 2011 Oct;24 Suppl 1:72–4.

94. Moore TA, Wilson ME. Feeding intolerance: a concept analysis. Adv Neonatal Care Off J Natl Assoc Neonatal Nurses. 2011 Jun;11(3):149–54.

95. Lee JS, Polin RA. Treatment and prevention of necrotizing enterocolitis. Semin Neonatol SN. 2003 Dec;8(6):449–59.

96. Cunningham FG, Leveno KJ, Bloom SL,Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS editors. Williams Obstetrics 24rd ed. United States of America: McGrawHill Companies; 2014.Fetal imaging; P. 194- 230.

97. Cunningham FG, Leveno KJ, Bloom SL,Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS editors. Williams Obstetrics 24rd ed. United States of America: McGrawHill Companies; 2014.Amniotic fluid; P. 231- 239.

98. Furman L and Schanler RJ. Acid –Base, fluid, and electrolyte management. In: Gleason CA and Devaskar S editors. Avery's Diseases of the Newborn, 9th Edition. Philadelphia: Elsevier Saunders,publishers 2012. P. 367 - 389.

99. Kasat K, Hendricks-Muñoz KD, Mally PV. Neonatal red blood cell transfusions: searching for better guidelines. Blood Transfus. 2011 Jan;9(1):86–94.

100. Steven AA. Abnormalities of serum calcium and magnesium. In: Cloherty JP, Eichenwald EC, Hansen AR, Stark AR.editors, Manual of

Neonatal care. 7th ed. Philadelphia: Wolters Kluwers/Lippincot Williams & Wilkins; 2012.pp.297- 303.

101. Nock ML.Appendix B Ttables of normal values. In: Martin RJ, Fanaroff AA, Walsh MC editors, Fanaroff and Martin's Neonatal – Perinatal medicine Disease of the fetus and Infant, 10th ed. Philadelphia, Elsevier Saunders publishers 2015; p1809- 1836. 113.

102. Agarwal R, Virmani D, Jaipal ML, Gupta S, Gupta N, Sankar MJ, et al. Vitamin D status of low birth weight infants in Delhi: a comparative study. J Trop Pediatr. 2012 Dec;58(6):446–50.

103. Tergestina M, Jose A, Sridhar S, Job V, Rebekah G, Kuruvilla KA, et al. Vitamin D status and adequacy of standard supplementation in preterm neonates from South India. J Pediatr Gastroenterol Nutr. 2014 May;58(5):661–5.

104. Shalak LF, Perlman JM, Jackson GL, Laptook AR. Depression at birth in term infants exposed to maternal chorioamnionitis: does neonatal fever play a role? J Perinatol Off J Calif Perinat Assoc. 2005 Jul;25(7):447–52.

105. Executive summary: Neonatal encephalopathy and neurologic outcome, second edition. Report of the American College of Obstetricians and Gynecologists' Task Force on Neonatal Encephalopathy. Obstet Gynecol. 2014 Apr;123(4):896–901.

106. Stark AR. Apnea In: Cloherty JP, Eichenwald EC, Hansen AR, Stark AR. editors, Manual of Neonatal care. 7th ed. Philadelphia: Wolters Kluwers/Lippincot Williams & Wilkins; 2012: p 397- 402.

107. Parad RB. Bronchopulmonary dysplasia/ chronic lung disease In: Cloherty JP, Eichenwald EC, Hansen AR, Stark AR. editors, Manual of Neonatal care. 7th ed. Philadelphia: Wolters Kluwers/Lippincot Williams & Wilkins; 2012: p 417-428.

108. Soul JS. Intracranial hemorrhage In: Cloherty JP, Eichenwald EC, Hansen AR, Stark AR. editors, Manual of Neonatal care. 7th ed. Philadelphia: Wolters Kluwers/Lippincot Williams & Wilkins; 2012: p 686- 710.

109. Vanderveen DK and Zupancic JAF. Retinopathy of prematurity In: Cloherty JP, Eichenwald EC, Hansen AR, Stark AR. editors, Manual of Neonatal care. 7th ed. Philadelphia: Wolters Kluwers/Lippincot Williams & Wilkins; 2012: p 840- 845.

110. Skullerud K. Variations in the size of the human brain. Influence of age, sex, body length, body mass index, alcoholism, Alzheimer changes, and cerebral atherosclerosis. Acta Neurol Scand Suppl. 1985;102:1–94.

111. Belfort MB, Gillman MW, Buka SL, Casey PH, McCormick MC. Preterm infant linear growth and adiposity gain: trade-offs for later weight status and intelligence quotient. J Pediatr. 2013 Dec;163(6):1564–9.e2.

112. Martin CR, Brown YF, Ehrenkranz RA, O'Shea TM, Allred EN, Belfort MB, et al. Nutritional practices and growth velocity in the first month of life in extremely premature infants. Pediatrics. 2009 Aug;124(2):649–57.

113. Cooke RW, Lucas A, Yudkin PL, Pryse-Davies J. Head circumference as an index of brain weight in the fetus and newborn. Early Hum Dev. 1977 Oct;1(2):145–9.

114. Neubauer V, Griesmaier E, Pehböck-Walser N, Pupp-Peglow U, Kiechl-Kohlendorfer U. Poor postnatal head growth in very preterm infants is associated with impaired neurodevelopment outcome. Acta Paediatr Oslo Nor 1992. 2013 Sep;102(9):883–8.

115. Belfort MB, Rifas-Shiman SL, Sullivan T, Collins CT, McPhee AJ, Ryan P, et al. Infant growth before and after term: effects on neurodevelopment in preterm infants. Pediatrics. 2011 Oct;128(4):e899–906.

116. Forbes GB. Stature and lean body mass. Am J Clin Nutr. 1974 Jun;27(6):595–602.

117. Lubchenco LO, Hansman C, Boyd E. Intrauterine growth in length and head circumference as estimated from live births at gestational ages from 26 to 42 weeks. Pediatrics. 1966 Mar;37(3):403–8.

118. Hay WW. Optimizing protein intake in preterm infants. J Perinatol Off J Calif Perinat Assoc. 2009 Jul;29(7):465–6.

119. Kashyap S, Schulze KF, Forsyth M, Dell RB, Ramakrishnan R, Heird WC. Growth, nutrient retention, and metabolic response of low-birth-weight infants fed supplemented and unsupplemented preterm human milk. Am J Clin Nutr. 1990 Aug 1;52(2):254–62.

120. Miller J, Makrides M, Gibson RA, McPhee AJ, Stanford TE, Morris S, et al. Effect of increasing protein content of human milk fortifier on growth in preterm infants born at <31 wk gestation: a randomized controlled trial. Am J Clin Nutr. 2012 Mar;95(3):648–55.

121. Moya F, Sisk PM, Walsh KR, Berseth CL. A New Liquid Human Milk Fortifier and Linear Growth in Preterm Infants. Pediatrics. 2012 Oct 1;130(4):e928–35.

122. Kashyap S and Heird WC. Protein and amino acid metabolism and requirements, In: Polin RA, Fox WW and Abman SH. editors Fetal and Neonatal physiology 4th ed. Philadelphia, Elsevier Saunders publishers 2011; p: 603 -614.

123. Lucas A, Fewtrell MS, Morley R, Lucas PJ, Baker BA, Lister G, et al. Randomized outcome trial of human milk fortification and developmental outcome in preterm infants. Am J Clin Nutr. 1996 Aug 1;64(2):142–51.

124. Hall RT. Nutritional follow-up of the breastfeeding premature infant after hospital discharge. Pediatr Clin North Am. 2001 Apr;48(2):453–60.

125. Abrams SA, Schanler RJ, Garza C. Bone mineralization in former very low birth weight infants fed either human milk or commercial formula. J Pediatr. 1988 Jun;112(6):956–60.

126. Pettifor JM, Rajah R, Venter A, Moodley GP, Opperman L, Cavaleros M, et al. Bone mineralization and mineral homeostasis in very low-birth-weight infants fed either human milk or fortified human milk. J Pediatr Gastroenterol Nutr. 1989 Feb;8(2):217–24.

127. Agarwal R, Singal A, Aggarwal R, Deorari AK, Paul VK. Effect of fortification with human milk fortifier (HMF) and other fortifying agents on the osmolality of preterm breast milk. Indian Pediatr. 2004 Jan;41(1):63–7.

128. Commentary on breast-feeding and infant formulas, including proposed standards for formulas. Pediatrics. 1976 Feb;57(2):278–85.

129. Aceti A, Corvaglia L, Paoletti V, Mariani E, Ancora G, Galletti S, et al. Protein Content and Fortification of Human Milk Influence Gastroesophageal Reflux in Preterm Infants. J Pediatr Gastroenterol. 2009;49(5):613–8.

130. Lafeber HN. Fortification of human milk fed to preterm infants: are our guidelines safe? J Pediatr Gastroenterol Nutr. 2013 Oct;57(4):414.

131. Ewer AK, Yu VY. Gastric emptying in pre-term infants: the effect of breast milk fortifier. Acta Paediatr Oslo Nor 1992. 1996 Sep;85(9):1112–5.

132. Moody GJ, Schanler RJ, Lau C, Shulman RJ. Feeding tolerance in premature infants fed fortified human milk. J Pediatr Gastroenterol Nutr. 2000 Apr;30(4):408–12.

133. Bhat BA, Gupta B. Effects of human milk fortification on morbidity factors in very low birth weights infants. Ann Saudi Med. 2001 Nov;21(5-6):292–5.

134. Hanson C, Sundermeier J, Dugick L, Lyden E, Anderson-Berry AL. Implementation, process, and outcomes of nutrition best practices for infants <1500 g. Nutr Clin Pract Off Publ Am Soc Parenter Enter Nutr. 2011 Oct;26(5):614–24.

APPENDIX. (I) ENGLISH INFORMATION SHEET AND CONSENT FORM

Christian Medical College, Vellore
Department of Neonatology

A randomized controlled trial comparing the effect of fortification of human milk with an infant formula powder on the growth of very low birth weight babies

Information sheet

The FOAM TRIAL

Fortification of administered milk trial

Breast milk is the best milk for babies. However for preterm babies, who need to grow faster, breast milk alone does not provide enough nutrients. Hence the present recommendation is to fortify the expressed breast milk supplied to preterm babies with commercially available fortifiers, so as to retain the advantages of breast milk along with enhancing the nutritive value of milk which will support the growth of babies. Only one Human milk fortifier is available in India at present and that too is not easily available in small towns and cities. The daily fortification of milk with this may cost around Rs 75 – 100 / day. To overcome this problem of cost and availability, we plan to study if adding readily available infant formula powder to the expressed breast milk growth in preterm babies can be improved.

How will the study proceed?

Your baby who is born Very low birth weight ($\leq$ 1500 gms), after your consent will be randomly divided into one of two groups: One will receive the expressed breast milk along with supplementation of vitamins and other additives as per our usual policy. The other group will receive expressed breast milk with added infant formula powder along with supplementation with vitamins, minerals and other additives as per our policy. The baby will be closely monitored for various growth parameters and with blood tests. The blood tests that will be required will be done along with the routine sampling required for treatment of the baby every week once the baby is recruited in the study Thus there will be no additional procedures or sampling done, and no additional cost to you.

What is fortification of expressed breast milk?

All preterm babies are fed expressed breast milk through a tube. As this is not usually enough for their growth, it is recommended to add human milk fortifier which has extra protein and minerals. In resource limited settings where the availability of HMF is not that easy or is too costly for parents, we are trying to see if a cheaper alternative like infant formula powder can be used to fortify expressed breast milk.

Does fortification of milk has any side effects?

Fortification of milk is a standard procedure for feeding of preterm VLBW babies all over the world and it doesn't seem to have any side effects. Babies receiving fortified breast milk have been shown to have better growth outcome as compared to their counter parts receiving unfortified breast milk.

If you give consent to include the baby in the study, what does it imply for your baby?

If you agree and give consent for recruiting your baby in the study, once your baby reaches full feeds, your baby will be randomly assigned to one of the groups: one group receiving fortified breast milk and other group will receive the unfortified breast milk. Both groups will continue to be given all the vitamins and additives that are usually given in our nursery. Your baby may be in either of the groups.

Baby will be monitored regularly in the nursery for several growth parameters like daily weight gain and also the length and head circumference one weekly. Routine blood test will be done once every 7days from the day of recruitment until discharge or baby reaches a weight of 1800gms. All other treatments that is required as per the baby condition will be continued for the baby as per the nursery protocol.

Can you withdraw from this study after it starts?

Your babies participation in this study is entirely voluntary and you are also free to decide to withdraw permission to participate in this study at any point of time.. If you do so, this will not affect the usual treatment of your baby in this hospital in any way.

What will happen if your baby develop any study related injury?

We do not expect any injury to happen to your baby but if at all your baby develops any side effects or problems due to the study, these will be treated at no cost to you.

Will you have to pay for the inclusion in the study?

All babies recruited in either of the group will not have to pay for inclusion in to the study. Formula required for fortification will be supplied by the Hospital. Blood tests done for study purpose will not be charged. Any other treatment that your baby will receive will continue as per the nursery protocols and would be charged as per the hospital policy.

What happens after the study is over?

Your baby may or may not benefit from the study trial. Once the study is over, policy decision will be taken, whether to administer the formula fortified milk or continue the unfortified milk to the preterm baby as per the evidence gathered from the study

Will your personal details be kept confidential?

The results of this study will be published in a medical journal but your baby will not be identified by name in any publication or presentation of results.

If you have any further questions, please ask Dr Vijay Gupta, (tel: 0416 2283311 or email: vijaygupta@cmcvellore.ac.in)

CONSENT TO TAKE PART IN A CLINICAL TRIAL

Study Title: A randomized controlled trial comparing the effect of fortification of human milk with an infant formula powder on the growth of very low birth weight babies

We have received information about what the project involves and we give our consent for our son/daughter to participate. We are aware that participation in the project is voluntary and that we may withdraw our son/daughter from the study at any time. We are also aware that we can at any time ask to have the information recorded about us and our child deleted, also after the study has ended.

(Please tick boxes)
Declare that I have read the information sheet provide to me regarding this study and have clarified any doubts that I had. [ ]
I also understand that my baby's participation in this study is entirely voluntary and that I am free to withdraw permission to continue to participate at any time without affecting my baby's usual treatment [ ]
I understand that the study staff and institutional ethics committee members will not need my permission to look at my baby's health records even if my baby is excluded from the trial. I agree to this access [ ]
I understand that my baby's identity will not be revealed in any information released to third parties or published [ ]
I voluntarily provide my consent to enroll my baby in this study [ ]

Name: ***Hosp No:***

Date of birth:

Mother's name: ……..

Father's name: ……..

Home address: ……..

Home telephone: ……..

Mobile telephone mother: ……..

Mobile telephone father: ……..

Email address: ……

Place/date: ***Signature:…….***

Name of witness:
Relation to participant: Date:

APPENDIX (II). TAMIL INFORMATION SHEET AND CONSENT FORM

மிக குறைந்த உடல் எடையுடன் பிறந்த குழந்தைகளுக்கு அளிக்கப்படும் செறிவூட்டப்பட்ட தாய்ப்பால் அல்லது குழைந்தகைளுக்குான பவுடர் பாலின் பலன்களை சமவாய்ப்பிட்டு கட்டுப்படுத்தப்பட்ட ஒப்பிட்டு சோதனை (ராண்டமைஸ்டு கன்ட்ரோல்ட் ட்ரையல் கம்பேரிங் தி எஃப்க்ட் ஆப் போர்டிபிகேஸன் ஆப் யூமன் மில்க் வித் என் இன்ஃபாண்ட் பார்மூலா பவுடர் ஆன் தி குரோத் ஆப் வெரி லோ பர்த் வெய்ட் பேபிஸ்).

தகவல் தாள்

தாய்பாலே குழந்தைகளுக்கு சிறந்த பால். எனினும் குறை பிரசவத்தில் பிறந்த குழந்தைகள் விரைவாக வளர்வதற்கு தாய்பாலில் இருக்கும் ஊட்டச்சத்துகள் போதுமானதில்லை. எனவே தற்போதைய பரிந்துரை என்னவெனில் குறை பிரசவத்தில் பிறந்த குழந்தைகளுக்கு கறந்தெடுத்த தாய்பாலில் வெளிச்சந்தையில் கிடைக்கும் செறிவூட்டிகளை கலந்து அளிப்பதன் மூலம் தாய்பாலின் நலன்களை தக்க வைத்துக் கொள்வதோடு பாலின் ஊட்டச்சத்தை அதிகரித்து கொடுப்பது குழந்தை வளர உதவும். இந்தியாவில் தற்போது ஒரேயொரு தாய்ப்பால் செறிவூட்டிதான் கிடைக்கிறது அதுவும் இது சிறு நகரங்களிலும் கிராமங்களிலும் சுலபமாக கிடைப்பதில்லை. இந்த செறிவூட்டிகளை கொண்டு தயாரிக்கும் பாலுக்கு ஒருநாளைக்கு ரூ.75 லிருந்து 100 வரை செலவாகிறது. விலை மற்றும் கிடைக்கக்கூடியதிலிருக்கும் இந்த பிரச்சனையை சமாளிக்க, எளிதில் கிடைக்கும் பவுடர் பாலை தாய்பாலுடன் கலந்து கொடுத்தால் குழந்தைகள் விரைவாக வளர உதவுமா என கண்டறிய நாங்கள் ஆய்வு மேற்கொள்ள திட்டமிட்டுள்ளோம்.

ஆய்வு எப்படி நடத்தப்படும்?

இந்த ஆய்வில் குழந்தைகள் இரண்டு குழுக்களாக பிரிக்கப்பட்டு ஒரு குழுவில் உள்ள குழந்தைகள் நமது வழக்கமான முறைப்படி கறந்தெடுத்த தாய்பாலுடன் கூடுதல் வைட்டமின்கள் மற்றும் மற்ற சத்து பொருட்களும் கலந்து அளிக்கப்படும். மற்றொரு குழுவில் உள்ள குழந்தைகளுக்கு கறந்தெடுத்த தாய்பாலுடன் பவுடர் பாலும் கூடுதல் வைட்டமின்கள் மற்றும் மற்ற சத்து பொருட்களும் கலந்து அளிக்கப்படும். உங்கள் குழந்தை மிக குறைவான எடையில் பிறந்துள்ளது (≤1500), நீங்கள் ஆய்வில் பங்கு கொள்ள சம்மதித்த பின் உங்கள் குழந்தை இந்த இரண்டு குழுக்களில் ஏதாவது ஒரு குழுவில் தோரயமாக சேர்க்கப்படுவர். குழந்தைகள் நெருக்கமாக பல்வேறு வளர்ச்சி காரணிகள் மற்றும் இரத்தப் பரிசோதனை மூலம் கண்காணிக்கப்படுவார்கள். தேவைப்படும் இரத்தப்பரிசோதனைகள் வழக்கமாக செய்யப்படும் இரத்த மாதிரிகளை கொண்டே ஆய்வில் சேர்க்கப்பட்டவுடன் இரண்டு வாரத்திற்கு ஒருமுறை செய்யப்படும். ஆதலால் இதற்கென்று தனியாக இரத்தம் எடுக்கத்தேவையில்லை மற்றும் கூடுதல் செலவுமில்லை.

கறந்தெடுத்த பாலை செறிவூட்டுதல் என்றால் என்ன?

குறை பிரசவத்தில் பிறந்த குழந்தைகளுக்கு கறந்தெடுத்த பால் ஒரு குழாய் வழியாக அளிக்கப்படுகிறது. இது குழந்தைகளின் வளர்ச்சிக்கு போதுமானதல்ல, எனவே தாய்பாலுடன் புரதம் மற்றும் மற்ற சத்துக்கள் அடங்கிய தாய்பால் செறிவூட்டியை சேர்த்தளிக்க பரிந்துரைக்கப்படுகிறது. வளங்கள் குறைந்த இடங்களில் இந்த தாய்பால் செறிவூட்டி எளிதாக கிடைப்பதில்லை மற்றும் இது பெற்றோர்களுக்கு கூடுதல் செலவை ஏற்படுத்துவதால் நாங்கள் எளிதில் கிடைக்கும் பவுடர் பால் போன்ற மாற்று பொருள் தாய்பாலை செறிவூட்டுவதற்கு பயன்படுமா என்று பார்க்கவிருக்கிறோம்.

தாய்பாலை செறிவூட்டுவதில் ஏதேனும் பக்க விளைவுகள் உள்ளதா?

தாய்பாலை செறிவூட்டுதல் என்பது சாதாரணமாக உலகளிவில் குறை பிரசவத்தில் எடை குறைவாக பிறந்த குழந்தைகளுக்கு சாதாரணமாக செய்யப்படும் ஒரு கவணிப்பு இதில் எந்த பக்க விளைவுகளும் இருப்பதாக இதுவரை அறியப்படவில்லை. ஆனாலும், செறிவூட்டுவது குறை பிரசவத்தில் எடை

குறைவாக பிறந்த குழந்தைகளுக்கு அளிக்கப்படும் பாலில் ஏற்றுக்கொள்ள கூடியதற்கு குறைவான அளவாக உள்ள ஓஸ்மலாலிடியை அதிகரிக்கிறது. செறிவூட்டப்பட்ட தாய்பால் பெறும் குழந்தைகள் செறிவூட்டப்படாதா தாய்பால் பெறும் குழந்தைகளோடு ஒப்பிடும் போது நல்ல வளர்ச்சியை பெறுவதாக கண்டறியப்பட்டுள்ளது.

ஆய்வில் என் குழந்தையை பங்குகொள்ள சம்மதித்தால், அதனால் குழந்தைக்கு என்ன நடக்கும்?

நீங்கள் ஆய்வில் பங்கு கொள்ள சம்மதித்தால் உங்கள் குழந்தை முழு அளவு பால் உட்கொள்ள ஆரம்பித்தால் உங்கள் குழந்தை கீழ்கண்ட இரண்டு குழுக்களில் ஏதாவது ஒரு குழுவில் தோரயமாக சேர்க்கப்படுவர்: ஒரு குழுவில் உள்ள குழந்தைகளுக்கு செறிவூட்டப்பட்ட பாலும் மற்றொரு குழுவில் உள்ள குழந்தைகளுக்கு செறிவூட்டப்படாத பாலும் அளிக்கப்படும். இரண்டு குழுக்களிலும் உள்ள குழந்தைகளுக்கும் கூடுதல் வைட்டமின்கள் மற்றும் மற்ற சத்து பொருட்களும் கலந்து அளிக்கப்படும். குழந்தைகள் நர்சரியில் அதன் வளர்ச்சி காரணிகளான உடல் எடை கூடுதல், நீளம் மற்றும் தலை சுற்றளவு ஆகியவை தொடர்ந்து கண்காணிக்கப்படும். ஆய்வில் சேர்க்கப்பட்டபின் 14 நாட்களுக்கு ஒரு முறை நர்சரியிலிருந்து டிஸ்சார்ஜ் செய்யப்படும் வரை அல்லது உடல் எடை 1800 கிராம் அடையும் வரையில் இரத்தப் பரிசோதனை செய்யப்படும். குழந்தையின் நோய்க்கேற்ப அதற்கு உண்டான மற்ற சிகிச்சைகள் நர்சரியின் நெறிமுறைகள் படி அளிக்கப்படும்.

இந்த ஆய்விலிருந்து ஆய்வு தொடங்கிய பின் விலகிக்கொள்ளலாமா?

ஆய்வில் பங்கேற்பது உங்கள் தன்னிச்சையான முடிவு. நீங்கள் ஆய்வில் பங்கேற்க அளித்த அனுமதியை திரும்பப்பெற சுதந்திரமாக முடிவுசெய்யலாம். நீங்கள் அவ்வாறு முடிவெடுத்தால் அது இந்த மருத்துவமனையில் அளிக்கப்படும் வழக்கமான சிகிச்சையை எந்த விதத்திலும் பாதிக்காது,

எங்களுக்கு ஆய்வு தொடர்பான பாதிப்பு ஏற்பட்டால் என்ன நடக்கும்?

உங்களுக்கு எந்தவிதமான பாதிப்பும் ஏற்படாது என்று எதிர்பார்க்கிறோம். ஆயினும் உங்களுக்கு ஏதாவது பக்க விளைவுகள் ஏற்பட்டால் அவற்றிற்கு தக்க சிகிச்கையளிக்கபடும், ஆனால் எங்களால் இதற்காக எந்த பண இழப்பீடும் தர இயலாது.

நாங்கள் இந்த ஆய்வில் கலந்து கொள்வதற்கு பணம் செலுத்த வேண்டுமா?

ஆய்வில் பங்குகொள்வதற்கு நீங்கள் எதுவும் பணம் செலுத்தத்தேவையில்லை. ஆய்விற்காக செய்யப்படும் அனைத்து இரத்தப்பரிசோதனைகளும் இலவசமாக செய்யப்படும். செறிவூட்டப்பட்ட பால் மருத்துவமனையால் தரப்படும். மற்ற சிகிச்சைகள் நர்சரியின் நெறிமுறைகள் படி அளிக்கப்படும். இது உங்கள் குழந்தைக்கு அளிக்கப்படும் சிகிச்சையில் சேர்க்கப்பட்டுள்ளது அதற்கு நீங்கள் பணம் செலுத்தவேண்டும்.

ஆய்வு முடிந்த பின் என்ன நடக்கும்?

இந்த ஆய்வினால் உங்கள் குழந்தை பலனடைந்திருக்கலாம் அல்லது பலனடையமாலுமிருக்கலாம். ஆய்வு முடிந்த பின் ஆய்வில் சேகரிக்கப்பட்ட தகவல்களின் அடிப்படையில் செறிவூட்டப்பட்ட பால் அளிப்பதா அல்லது செறிவூட்டப்படாத பால் அளிப்பதா என்பதற்கான கொள்கை முடிவு எடுக்கப்படும்.

உங்கள் தனிப்பட்ட விவரங்கள் இரகசியமாக வைக்கப்படுமா?

இந்த ஆயிவிலிருந்து பெறப்படும் முடிவுகள் ஒரு மருத்துவ இதழில் பிரசுரிக்கப்படும். ஆனால் உங்களைப்பற்றிய தகவல்களை உங்கள் பெயரைக்கொண்டு பிரசுரத்திலோ அல்லது எந்த படைப்பிலோ அடையாளம் காண முடியாது. ஆனாலும் உங்களின் மருத்துவ பதிவேடுகளை ஆய்வில் ஈடுபடும் நபர்கள் உங்களின் முன் அனுமதியின்றி பார்க்க முடியும்.

உங்களுக்கு மேலும் இந்த ஆய்வு பற்றி கேள்விகள் இருந்தால் கீழ்கண்ட மருத்துவரை அணுகவும்

மருத்துவர் விஜய் குப்தா (தொலை பேசி எண்: 0416 – 2283311) (கைபேசி: 9787763448). email: vijaygupta@cmcvellore.ac.in

ஒப்புதல்

தலைப்பு: மிக குறைந்த உடல் எடையுடன் பிறந்த குழந்தைகளுக்கு அளிக்கப்படும் செறிவூட்டப்பட்ட தாய்ப்பால் அல்லது குழைந்தகைளுக்குான பவுடர் பாலின் பலன்களை சமவாய்ப்பிட்டு கட்டுப்படுத்தப்பட்ட ஒப்பிட்டு சோதனை (ராண்டமைஸ்டு கன்ட்ரோல்ட் ட்ரையல் கம்பேரிங் தி எஃப்க்ட் ஆப் போர்டிபிகேஸன் ஆப் யூமன் மில்க் வித் என் இன்ஃபாண்ட் பார்மூலா பவுடர் ஆன் தி குரோத் ஆப் வெரி லோ பர்த் வெய்ட் பேபிஸ்).

ஆய்வு எண்

நோயாளியின் பெயர்

பிறந்த தேதி வயது

----------ன் தாய் /தந்தை

ஆகிய ---------- நான்

கட்டத்தில் குறியிடவும்

1. நான் இந்த ஆராய்ச்சியின் தகவல் அறிக்கையை படித்து புரிந்துகொண்டேன் என்று உறுதியளிக்கின்றேன். மேலும், இந்த ஆராய்ச்சி பற்றி கேள்விகள் கேட்க எனக்கு சந்தர்ப்பமளிக்கப்பட்டது என்றும் உறுதியளிக்கின்றேன. ☐

2. இந்த ஆராய்ச்சியில் பங்கேற்பது என் தன்னிச்சையான முடிவு என்றும் இந்த ஆராய்ச்சியிலிருந்து எப்பொழுது வேண்டுமாளாலும் எந்த காரணமுமில்லாமல் விடுவித்துகொள்ளலாம் என்றும் அது என் குழந்தைக்கு அளிக்கப்படும் மருத்துவ சிகிச்சையையும் எங்களது சட்டபூர்வமான உரிமையையும் எந்த விதத்திலும் பாதிக்காது என புரிநதுகொண்டேன் என்று உறுதியளிக்கின்றேன். ☐

3. எனக்கோ என் மருத்துவருக்கோ என் குழந்தைக்கு எந்த அளவு ஊட்டசத்து அளிகக்படவுள்ளது என்பது தெரியாது என்பதை புரிந்து கொண்டேன் ☐

4. இந்த ஆய்வின் ஆதரவாளர்கள் மற்றும் அவர் சார்பாக வேலை செய்பவர்கள், நெறிமுறைகள் குழு மற்றும் கட்டுப்பாட்டு அதிகாரிகள் என் மருத்துவ பதிவேடுகளை நான் இந்த ஆய்விலிருந்து விலகிக்கொண்டாலும் பார்க்கலாம் என்று புரிந்து கொண்டேன். இதற்கு நான் ஒப்புதல் அளிக்கின்றேன் என்னை பற்றிய எந்த தகவலும் மூன்றாவது நபருக்கு தெரியப்படுத்தப்படாது என்றும் பிரசுரிக்கபடாது என்றும் புரிந்து கொண்டேன். ☐

5. இந்த ஆய்வில் பங்கு கொள்ள செய்ய தன்னிச்கையாக ஒப்புதல் அளிக்கின்றேன். ☐

கையொப்பம் (அ) பெருவிரல் ரேகை

தேதி

கையொப்பமிட்டவரின் பெயர்

ஆய்வாளரின் கையொப்பம்
தேதி
ஆயாவாளரின் பெயர்

சாட்சியின் கையொப்பம்
தேதி
சாட்சியின் பெயர்

APPENDIX . (III) TELUGU INFORMATION SHEET AND CONSENT FORM

క్రిస్టియన్ మెడికల్ కాలేజి, వెల్లూరు
డిపార్టుమెంటు ఆఫ్ నియోనేటాలజీ

చాల తక్కువ బరువుతో పుట్టిన బిడ్డయొక్క పెరుగుదలను మానవ పాల యొక్క ఫోర్టిఫికేషన్ లేదా పిల్లల డబ్బాపొడి పాల యొక్క ప్రభావము పోల్చడము యొక్క యాదృచ్ఛిక నియంత్రిత పరిశీలన.

సమాచారపత్రము
FOAM విచారణ
ఫోర్టిఫికేషన్ ఆఫ్ ఓన్ మదర్స్ మిల్క్ ట్రయల్

తల్లిపాలు బిడ్డకు ఉత్తమము. కాని తొమ్మిది నెలలు నిండక ముందే పుట్టిన బిడ్డలు వేగముగా పెరుగుటకు తల్లిపాలలోని పోషకాలు సరిపోవు. అందుకే తొమ్మిది నెలలు నిండక ముందే పుట్టిన బిడ్డలకు ఇచ్చే తల్లి పాలను ఫోర్టిఫై చెయ్యడానికి వాణిజ్యపరంగా అందుబాటులో పౌడర్ ఫోర్టిఫయర్స్ ఉన్నాయి. కాబట్టి పిల్లల పెరుగుదలకు మద్దతు నిచ్చే తల్లి పాల యొక్క ప్రయోజనాలతో పాటు పాలపోషక విలువలను మెరుగు పరుస్తాయి. ప్రస్తుతము భారతదేశములో ఒకే ఒక్క మానవపాల ఫోర్టిఫైయర్ ఉంది మరియు చిన్న పట్టణాలలోను, నగరాలలోను ఇది అంత సులభముగా దొరకదు. ఒక రోజుకు 75 నుండి 100 రూపాయలు ఖర్చు అవుతుంది. ధర మరియు అందుబాటు సమస్యలను అధిగమించటానికి నెలలు నిండక ముందే పుట్టిన బిడ్డల పాల ఫోర్టిఫికేషన్ కొరకు తల్లి పాలతో పాటు అందుబాటులో ఉన్న ఇన్ఫాంట్ ఫార్ములా పొడిని కలపడము వలన బిడ్డ పెరుగుదలకు ఉపయోగపడుతుందా అని తెలుసుకొనుటకు ఈ అధ్యయనము చేయదలచుకున్నాము.

ఈ అధ్యయనము ఎలా చేస్తారు?
చాల తక్కువ బరువుతో (≤1500గ్రాములు) పుట్టిన మీ బిడ్డ ఎంపిక అయిన తరువాత లాటరీ ద్వారా రెండు సమూహాలలో ఒక సమూహములో ఉంటారు. ఒక సమూహములో ఉన్న బిడ్డలు తల్లిపాలతో పాటు సప్లిమెంట్ విటమిన్లను ఇస్తారు, మరియు మా పాలసీ ప్రకారము ఇతర బిడ్డలు తల్లిపాలతో పాటు సప్లిమెంట్ విటమిన్లను పొందుతారు. రెండవ సమూహములో ఉన్న బిడ్డలకు తల్లిపాలలో ఇన్ఫాంట్ ఫార్ములా పొడిని కలిపి, దానితో పాటు సప్లిమెంట్ విటమిన్లు, ఐరన్ మరియు మాకు ధాతువు కలిపి ఇస్తారు. మేము మీ బిడ్డయొక్క పెరుగుదలను రక్త పరీక్షల ద్వారా తెలుసుకొంటాము. మీ బిడ్డ ఈ అధ్యయనములో పాల్గొన్నప్పుడు రక్త పరీక్షలను రెండు వారాలకు ఒకసారి చేస్తారు. దీని వలన అదనపు నొప్పి ఉండదు, మరియు అదనపు రక్త పరీక్షలు చేయనవసరము లేదు.

తల్లి పాల యొక్క ఫోర్టిఫికేషన్ అంటే ఏమిటి?
నెలలు నిండక ముందే పుట్టిన చిన్న బిడ్డలకు తల్లి పాలను ట్యూబు ద్వారా ఇస్తారు. ఇది మాత్రమే బిడ్డ యొక్క పెరుగుదలకు సరిపోదు గనుక, మానవపాల ఫోర్టిఫైయర్లో అధిక విటమిన్లు ఖనిజాలు ఉన్నందున దీనిని తల్లి పాలలో కలిపి ఇస్తారు. వనరుల పరిమిత ప్రాంతాలలో HMF సులభంగా

ధారకరణ, మరియు చుట్టు ప్రక్కలవారిచే చాలచిన్నచూపుకు గురయినది గనుక మేము ఆశ్రమమును స్థాపించిన మరియొక ప్రధానోద్దేశం ఏమనగా ఈ పిల్లలను చదివించి వారిని ఉన్నతులుగా చేయుటకై ఉపయోగపడే చేయూతను ఇవ్వడం.

పాలయొక్క ప్రాధాన్యతను గురించి మీరు ఏమనుకుంటున్నారు?

పాలయొక్క ప్రాధాన్యత ఇప్పటికి ఎంతగానో ఉన్నప్పటికంటే చాలా ఎక్కువగా ఉంది. ఎందుకంటే ఇప్పుడు పుట్టిన పిల్లలకు తల్లిపాలు లభించడం చాలా కష్టంగా ఉంది. ఎందుకంటే ఇప్పుడు ఉద్యోగాలు చేసే తల్లులు ఎక్కువగా ఉన్నారు. ఉద్యోగాలు చేసే తల్లులు పిల్లలకు పాలు ఇవ్వడానికి ఇబ్బందులు పడుతున్నారు. అందుకే ఇప్పుడు పుట్టిన పిల్లలకు పాలు లభించడం చాలా కష్టంగా ఉంది. అందుకే మేము ఆశ్రమంలో పాలు ఇవ్వడానికి ఇబ్బందులు పడుతున్న తల్లుల పిల్లలకు, ఎక్కువ పాలు ఇవ్వడానికి ఇబ్బందులు పడుతున్న తల్లుల పిల్లలకు, పాలు లభించడం కష్టంగా ఉన్న పిల్లలకు పాలు ఇవ్వడానికి ఏర్పాటు చేసాము.

మీ పిల్లలను దత్తత్తు ఇవ్వడానికి ముందు వారికి ఎటువంటి ఇంజక్షన్లు లేదా మోతాదులు ఇవ్వడం జరిగిందా?

మేము ఎప్పుడైతే మరియు దత్తత్తు ఇవ్వడానికి పిల్లలను ఎంపిక చేస్తామో వారికి ఆ సమయానికి ఏ రకమైన ఇంజక్షన్లు ఇవ్వడం జరగదు. ఎందుకంటే ఇంజక్షన్లు ఇవ్వడానికి ముందు వారికి ఆరోగ్యపరీక్షలు చేస్తాము. ఆ సమయంలో పిల్లలకు ఏ రకమైన ఇంజక్షన్లు ఇవ్వడం జరగదు. ఆ సమయంలో పిల్లలకు ఏ రకమైన మందులు ఇవ్వడం జరగదు

ఒకవేళ మొబిల్ కు ఆర్థోయన సంబంధిత దుష్ప్రభావాలు వేరొకరికి ఏమన్నా ఉంటాయా?
మొదట ఆర్థోయనము వలన ఎటువంటి దుష్ప్రభావాలు వేరొకరిలో ఉండవని ధృవీకరించలేదు. ఎందుకనగా ఒకవేళ మొబిల్ కు వేరొకరిలో దుష్ప్రభావాలు కలిగితే మొబిల్ కు ప్రత్యేకముగా చికిత్స చేస్తాము. అయితే మీరు ఎటువంటి ధనసహాయము ఇవ్వవలసిన అవసరము లేదు.

మొబిల్ ఆర్థోయనముతో చికిత్స చేసినచో ఏమాత్రం దోషం చెప్పించవలసి ఉంటుందా?
ఆర్థోయనముతో చికిత్స చేసినచో మొబిల్ దోషం చెప్పించవలసిన అవసరము లేదు. ఫార్మిస్ కంపెనీ వారిచే ఇవ్వబడిన పత్రాలను ధృవీకరిస్తూ సరళంగా చూస్తుంది. ఆర్థోయనమునకు సంబంధించిన ప్రశ్నలకు తగిన సమాధానాలు వైద్యులు చెప్పవలసి ఉంటుంది. చికిత్సకు సంబంధించిన చిన్న చిన్న సమస్యలకు కూడా వైద్యులను సంప్రదించవలసి ఉంటుంది. మరియు దీనికి సంబంధించిన చిన్న చిన్న సమస్యలను ధృవీకరించి తగిన సమాధానము చెప్పించవలసి ఉంటుంది.

ఆర్థోయనము తుంగినీనా ఉన్నాడా ఎలా?
మొబిల్ కు ఆర్థోయనము ద్వారా ప్రయోజనము పొందవచ్చు లేదా పొందకపోవచ్చు. ఒకవేళ ఆర్థోయనము తుంగినీనా ఉన్నట్లైతే మందు వ్యక్తిగత జీవితాలు ఫార్మిస్ కంపెనీ వారు ఫార్మిస్ కంపెనీ వారిని కానీ సంప్రదించవచ్చు లేదా పాలసీ నిర్ణయం తీసుకోవలసి ఉంది.

మొత్తానికి గల మిగతా విషయాలు కథనాన్ని ముగించడం ఉందా?
ఆర్థోయన ఔషధాలు మెడికేటెడ్ బ్యాండేజ్ లో ప్రచురించబడుతుంది. కానీ మీసేరు మరియు వాటికి గల మిగతా విషయాలు ఎందులోను ప్రచురించబడవు.

క్లినికల్ ప్రయోగాల్లో పాల్గొనడానికి ఒప్పుకోలు

పరిశోధన పేరు : చాలా తక్కువ బరువుతో పుట్టిన శిశువులకు పెద్దగుండెలను మోసుకు పోవడానికి మరియు ఇన్ఫెక్షన్ లేకుండా ఉండటానికి ఇచ్చే ఫార్ములా పాలకు ప్రత్యామ్నాయమును పోల్చడం యొక్క ప్రధాన ఉద్దేశ్యం తెలియజేయడం.

మేము మీకు సమాచారపత్రమును చదివాము. మరియు పరిశోధనకు సంబంధించిన సమాచారము మీకు ఇవ్వగా అడిగినది - మా కోఆర్డినేటర్ / కౌన్సిలర్ ఈ పరిశోధనలో పాల్గొనడం యొక్క ప్రయోజనాలు మరియు ప్రమాదాలను మీకు వివరించి చూపాము. మేము ఈ పరిశోధన నుండి విరమించుకోవడానికి ఏ సమయములో అయిన మీకు ఇష్టం వచ్చినప్పుడు స్వేచ్ఛ ఉంది. మా యొక్క, మా ఇష్టం యొక్క సంక్షేమం ప్రభావితం అవ్వకుండా మీ పిల్లవాడు ఎప్పుడైనా మేము తీసివేసినప్పుడు లేదా పరిశోధన మధ్యలో నుండి తీసివేయడానికి మీకు స్వేచ్ఛ ఉందని మీకు తెలుసు.

(దయచేసి ఈ క్రింది పెట్టెలలో టిక్ చెయ్యండి)

1 నాకు ఇవ్వబడిన ఈ పరిశోధనకు సంబంధించిన సమాచార పత్రికను చదివాను, మరియు సారాంశాలను అర్థం చేసుకున్నాను. [ ]

2 నా బిడ్డకు పరిశోధనలో పాల్గొనడం వలన చాలా మంచి, మరియు నా బిడ్డను ఈ పరిశోధన నుండి విరమించే చేయడానికి ఏ సమయంలోనైనా నాకు ఉన్న స్వేచ్ఛ అందరికీ తెలుసు. నేను ఈ పరిశోధన నుండి విరమించినా కూడా నా బిడ్డకు అన్ని రకాల ప్రయోజనాలను వ్యతిరేకత లేకుండా అందుతుంది అని తెలుసు. [ ]

3 ఈ పరిశోధనలోని మా బిడ్డకు ఏదయిన దుష్ఫలితాలు తలెత్తితే, దానికి సంబంధించిన వైద్యపరమైన చికిత్సలు అందుతాయి అని తెలుసు. అయితే వివిధమయిన ఆర్థికసహాయం చేస్తారో లేదు అనేది తెలుసు. [ ]

4 నేను నా బిడ్డను ఈ పరిశోధన నుండి విరమించుకున్నప్పటికి, పరిశోధనా సామాగ్రిలు మరియు వైద్యపరమైన సామాగ్రిలు నా బిడ్డ యొక్క ఆరోగ్య కార్యక్రమాలను చూడటానికి నాకు అనుమతులు లేదని నాకు తెలుసు. నేను చాలినన్ని సంఖ్యలో ఇవ్వబడ్డాను. [ ]

5 నా బిడ్డ యొక్క గుర్తింపును మూడవ వ్యక్తులకు తెలుసుగాని ప్రచురించిన ఏదయిన సమాచారంలో గాని ఎంతో జాగ్రత్త చెయ్యబడుతుంది అని నాకు తెలుసు. [ ]

6 నా బిడ్డ ఈ పరిశోధనలో పాల్గొనడానికి నేను స్వచ్ఛందంగా సంతకం చేస్తున్నాను. [ ]

పేరు : _____ హాస్టల్ నెంబరు : _____

పుట్టిన తేది : _____

తల్లి పేరు : _____

తండ్రి పేరు : _____

మీరు చేయునది : _____

_____

మీ ఫోను నెంబరు : _____

తల్లి ఫోను నెంబరు : _____

తండ్రి ఫోను నెంబరు : _____

మీ మెయిల్ అడ్రస్ : _____

సంతకము

స్థలము / తేది

సాక్షి పేరు :

ఆత్మీయులతో మీకు ఏ విధమైన బంధుత్వము :

మీకు ఏమైన ప్రశ్నలు ఉంటే దయచేసి మా విజయ్ గుప్తకు తెలియజేయండి.

ఫోను నెంబరు : 0416 2283311

మెయిల్ : vijaygupta@cmcvellore.acin

APPENDIX (IV): STUDY PROFORMA

FOAM TRIAL

Fortification of administered Milk trial

Name H No. Mother H No.

Sex Birth weight HC Length

Gestational Age DOB TOB

Address (Telephone No.)

Antenatal Historys

G P L A IUD END LND

Booked (Yes / No)

Maternal Complications:

PIH / severe Pre Eclampsia / Eclampsia

GDM (on diet/ Drugs/ Insulin) Pre Gesatational DM (Yes/ No)

APH (Abruption / Placenta Previa / Unidentified cause)

Other maternal complications (specify)

ANTENATAL SCAN (Date) Gestation ( )

Antenatal dopplers: S/D ratio PI

Absent End diastolic flow (Yes/ No) Reverse End diastolic flow (Yes / No)

AFI

Others

ANTEPARTUM STEROIDS

No. Of dosage (0 / 1 / 2 / others specify)

Regime

RISK OF SEPSIS: (Yes / No)

1. Spontaneous preterm 4. PROM > 24 hrs
2. PPROM Hrs/ Day 5. > 3 Vaginal Examination after ROM

3. GBS UTI 6. Chorioamnionitis

DELIVERY RECORD;

1. Normal 2. Forceps 3. Breech 4. Em. LSCS 5. EL. LSCS

Apgar score : 1' 5' 10' Cord PH BE

COMORBIDITIES:

1. Perintal depression
2. Hypoxic ischemic encephalopathy
3. Metabolic acidosis
4. Neonatal seizures
5. HMD If Yes: CPAP (Yes/ No) Ventilation (Yes/ No) HFOV (Yes/ No) Surfactant(Yes/No)
6. PDA If Yes: Drug used/ dosages
7. Feeding intolerance (without NEC)
8. NEC stage (1a 1b 2a 2b 3a 3b)
9. SEPSIS: If Yes: EOS (Yes / No) LOS (Yes / No)
    a. Suspected sepsis (Yes / No) b. Probable sepsis (Yes / No) c. Blood culture positive Sepsis Yes / No (Organism)
10. Chronic lung disease: If Yes: (Mild / Moderate / severe)
11. IVH If Yes: IVH Grade I / II /III / IV PVL (Yes/ No) [NSG Not Done]
12. ROP staging
13. Others specify

CENTRAL LINES:

1. UVC 2. UAC 3. PICC

COMPLCATIONS: (After Recruitment in the study)

1. **Dys electrolytemia** (Yes/ No)
    a. **Lowest Na+** **Highest Na+**
    b. **Lowest K+** **Highest K+**
    c. **Lowest Ca++** **Highest Ca++**
2. **Metabolic Acidosis (Yes/ No)**

3. **Hyperglycemia(Yes/ No)**
4. **Hypoglycemia (Yes/ No)**
5. Feeding intolerance (without NEC) (Yes/ No)
6. NEC stage (1a 1b 2a 2b 3a 3b)
7. SEPSIS(Yes / No)
    a. Suspected sepsis (Yes / No)
    b. Probable sepsis (Yes / No)
    c. Blood culture positive sepsis Yes / No (Organism)

DURATION OF STAY: Days

Death / Discharge/ Dama

STUDY DETAILS (CASE No. .....)

Randomisation sequence: .....)

(FORTIFICATION // STANDARD)

Time Schedule for Monitoring / Lab work up. DOB HNo.

- Monitor Weight daily
- Monitor HC and Length once weekly
- BUN and blood Gas once weekly
- Ca++ / PO4/ Alk PO4/Serum albumin/ Prealbumin : 1 month Chronological age

Day Recruitment	Day of life	**Feeds volume** ml/kg/day	Weight (gms)	Length (cms)	HC (cms)	Blood urea (mg/dl)	Pre albumin levels	Serum albumin	Blood gas				Na +	K+	Ca	Po 4	AL phos	Remarks	
									(Ph)	Co2	Hco3	BE							
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			

Day Recruitment	Day of life	**Feeds volume** ml/kg/day	Weight (gms)	Length (cms)	HC (cms)	Blood urea (mg/dl)	Pre albumin levels	Serum albumin	Blood gas				Na+	K+	Ca	Po4	ALphos	Remarks	
									(Ph)	Co2	Hco3	BE							
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
32																			
33																			
34																			
35																			
36																			
37																			
38																			
39																			
40																			
41																			
42																			
43																			
44																			
45																			
46																			
47																			
48																			
49																			
50																			

Day Recruitment	Day of life	**Feeds volume** ml/kg/day	Weight (gms)	Length (cms)	HC (cms)	Blood urea (mg/dl)	Pre albumin levels	Serum albumin	Blood gas				Na+	K+	Ca	Po4	ALphos	Remarks	
									(Ph)	Co2	Hco3	BE							
51																			
52																			
53																			
54																			
55																			
56																			
57																			
58																			
59																			
60																			
61																			
62																			
63																			
64																			
65																			
66																			
67																			
68																			
69																			
70																			
71																			
72																			
73																			
74																			
75																			
76																			
77																			
78																			
79																			

Day Recruitment	Day of life	**Feeds volume** ml/kg/day	Weight (gms)	Length (cms)	HC (cms)	Blood urea (mg/dl)	Pre albumin levels	Serum albumin	Blood gas				Na +	K+	Ca	Po 4	AL phos	Remarks	
									Ph	Co2	Hco3	BE							
80																			
81																			
82																			
83																			
84																			
85																			
86																			
87																			
88																			
89																			
90																			
91																			
92																			
93																			
94																			
95																			
96																			
97																			
98																			
99																			
100																			

FOAM TRIAL: Time schedule for workups

(FORTIFICATION // STANDARD)

Baby Name H No. DOB Randomisation date Randomisation Sequence

	Daily	**Once weekly**		**At 4-6 weeks of CA**					**Once weekly**				
Date	Wt	Length	HC	Ca++	PO4	AlPo4	Albumin	Prealbumin	BUN	Ph	CO2	HCO3	BE

APPENDIX (V): STUDY DATA MASTER SHEET

id	hr	foamid	name	bhno	mhno	dob	tob	sex	gage	bwt	hc	lth	book	tpn	grvd	hypt	gdm	pregdm	aph	uadopp	abndopp	sd	pl	llq	apthercros	del	apgar1	apgar	apgar1(	cordph	bexc	dab	hle	prema	postma
1	1	FOAM1/FORT1	LAVANYA	721080F	721215F	13/12/2013	12:39	1	33.3	1440	30	41	FALSE		2	1	0	0	0	1	FALSE	2.7		1	2 0	5	7	9	9			FALSE	FALSE	FALSE	FALSE
2	1	FOAM7/FORT3	MALATHI	721633F	698434F	26/12/2013	12:00	0	33.1	1440	29.4	41	TRUE		1	0	1	0	0	1	FALSE	2.5	0.9	2	2 2	5	9	10	10			FALSE	FALSE	FALSE	FALSE
3	1	FOAM6/STD4	SHYAMLA TWIN1	721646F	721289F	26/12/2013	19:03	1	31.6	1490	27.5	41.4	TRUE		2	0	0	0	0	0	FALSE			0	2 2	1	9	9	10			FALSE	FALSE	FALSE	FALSE
4	1	FOAM6/FORT5	NAAJOTHI	721493F	640446F	22/12/2013	09:21	0	31.3	1300	26	36	TRUE		2	2	3	1	0	1	FALSE	2.7	0.9	1	2 0	5	8	9	9	7.15	-8.4	FALSE	FALSE	TRUE	FALSE
5	1	FOAM10/STD3	SHYAMLA TWIN2	721647F	721289F	26/12/2013	19:10	1	31.6	1190	26	36.5	FALSE		2	0	0	0	0	0	FALSE			0	2 2	1	9	9	9			FALSE	FALSE	FALSE	FALSE
6	1	FOAM13/FORT9	LAKSHMIDEVI	741074F	004284D	04/01/2014	23:34	0	32.1	1340	28	41	TRUE		2	0	1	0	0	1	FALSE	2.8	1.1	1	2 2	4	9	9	10			FALSE	FALSE	FALSE	FALSE
7	1	FOAM1/STD1	PRIYA	721132F	708266F	14/12/2013	16:05	0	30.2	1060	26	36	TRUE	2	1	2	0	0	0		TRUE	4.5	1.4	0	2 0	5	9	9	9			FALSE	FALSE	FALSE	FALSE
9	1	FOAM15/STD10	JOTHI	741182F	750900F	08/01/2014	8:35	1	29.6	1385	28.5	40.8	TRUE		1	0	0	0	0	0	FALSE			1	0 0	1	8	9	10			FALSE	FALSE	FALSE	FALSE
10	1	FOAM26/FORT11	GAYATHRI MURUGAN TWIN	741399F	741503F	16/01/2014	17:15	0	32	1480	27.4	39.5	TRUE		1	0	0	0	0	0	FALSE			0	1 1	3	9	9	9			FALSE	FALSE	FALSE	FALSE
11	2	FOAM14/FORT4	SATHIYA PRIYA BABY	741115F	721946F	06/01/2014	8:27	0	29.2	1170	26.6	38.7	TRUE	1	1	0	0	0	0	0	FALSE			1	1 1	1	8	9	9			FALSE	FALSE	FALSE	FALSE
12	1	FOAM31/STD13	MULLAI TWIN1	741781F	741557F	26/01/2014	7:09	1	31	1470	27.5	40.4	TRUE		1	0	3	1	0	0	FALSE			0	0 0	5	6	9	9	6.93	-19.6	TRUE	FALSE	TRUE	FALSE
13	1	FOAM16/FORT7	BHUVINESHWARI	741184F	424327F	08/01/2014	10:22	0	33.6	1340	28.3	38.2	TRUE		1	0	0	0	0		TRUE	3.6	1.2	0	2 0	5	7	9	9			TRUE	FALSE	FALSE	FALSE
15	1	FOAM25/STD6	GAYATRI MURUGAN TWIN2	741400F	741503F	16/01/2014	17:19	1	32	1180	26.5	37.2	TRUE		1	0	0	0	0	0	FALSE			0	1 1	1	9	9	10			FALSE	FALSE	FALSE	FALSE
16	1	FOAM3/FORT20	PITCHAIMAMMAL	752450F	773558F	15/02/2014	12:06	1	32.2	1370	27.3	40	TRUE		2	0	3	1	0		TRUE	3.2	1.1	0	2 0	5	9	9	10			FALSE	FALSE	TRUE	FALSE
17	1	FOAM43/STD19	SHABANA	752465F	311043F	16/02/2014	21:22	0	30	1325	26.8	40.5	TRUE		2	2	1	0	0	1	FALSE	2.7	0.9	1	2 1	4	3	6	9	7.05	-7.6	TRUE	FALSE	FALSE	FALSE
18	1	FOAM34/FORT14	PRIYA	741837F	242540F	28/01/2014	13:33	1	31.4	1375	27.4	40.5	TRUE		2	0	0	0	2	0	FALSE			0	1 0	5	2	6	9	7.36	-2.6	TRUE	FALSE	FALSE	FALSE
19	1	FOAM35/FORT15	JAHIDA	741976F	741592F	02/02/2014	23:40	1	31.2	1400	26.9	39.5	TRUE		1	0	0	0	0	0	FALSE			0	0 1	2	9	9	9			FALSE	FALSE	FALSE	FALSE
20	1	FOAM36/STD16	GIRIJA	752171F	082740F	09/02/2014	11:30	1	32.6	1360	28	38.5	TRUE		1	2	0	0	0	0	FALSE			1	2 0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
21		FOAM37/STD17	SATHYA CHANDRAVATHI	752169F	790313F	09/02/2014	15:33	0	32.2	1320	27.2	38	TRUE		1	2	0	0	0	1	FALSE	2.6	0.9	0	2 0	5	9	9	9			FALSE	FALSE	FALSE	FALSE
22	1	FOAM38/FORT18	YUVANANDHINI	752214F	683227F	10/02/2014	18:41	1	30.5	1340	27.4	40.7	TRUE		1	1	1	0	1	0	FALSE			1	1 2	4	4	8	9	7.18	-7	TRUE	FALSE	TRUE	FALSE
23	1	FOAM23/FORT5	VISHWAKUMARI1	741301F	712660F	13/01/2014	3:49	1	28.2	840	27	31	TRUE	1	1	0	0	0	0	0	FALSE			1	1 1	1	7	7	8			FALSE	FALSE	TRUE	FALSE
24	1	FOAM18/FORT7	VISHWAKUMARI TRIPLET 2	741302F	712660F	13/01/2014	5:42	0	28.2	970	25.5	33	TRUE		1	0	0	0	0	0	FALSE			1	1 1	1				6.98	-15.1	TRUE	FALSE	TRUE	FALSE
25		FOAM19/STD8	VISHWAKUMARI TRIPLET3	741303F	712660F	13/01/2014	5:57	1	28.2	760	23.5	33	TRUE		1	0	0	0	0	0	FALSE			1	1 1	1	2	5	7	7.08	-16.4	TRUE	TRUE	TRUE	FALSE
26	1	FOAM30/STD9	PADMAJA	753673F		23/01/2014	23:30	1	30.3	1200	26	37.5	TRUE		1	0	0	0	0	0	FALSE			0	3 1	1						FALSE	FALSE	TRUE	FALSE
27	1	FOAM33/STD11	JESSICA BABU	741875F	448825D	29/01/2014	17:34	1	27.1	1040	24	36.8	TRUE	1	2	0	0	0	0	0	FALSE			1	1 1	1	7	9	9			TRUE	FALSE	TRUE	FALSE
28	2	FOAM41/FORT10	SHIKSAHIDA	752437F	752352F	14/02/2014	19:22	0	28.6	1135	25	37.6	TRUE		2	1	2	1	1	0	FALSE			1	1 0	5	7	8	9	7.3	-0.3	FALSE	FALSE	TRUE	FALSE
29	1	FOAM54/FORT21	ZAHAIDA BABU	755488F	755604F	16/03/2014	11:36	1	32.2	1460	28.5	40.8	TRUE		2	2	3	0	0	2	TRUE			1	2 0	5	7	8	9			FALSE	FALSE	FALSE	FALSE
30	1	FOAM55/STD23	SAMPOORNA	755763F	755601F	20/03/2014	14:50	1	32.2	1340	28	40	TRUE		1	1	0	0	0	1	FALSE	2.7	0.9	0	2 0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
31	1	FOAM53/FORT13	SUMI	755255F	717559F	10/03/2014	3:58	0	29.2	1230	25	37	TRUE		2	0	1	0	0	1	FALSE	2.3		3	2 2	3	2	6	8	6.91	-11.3	TRUE	FALSE	FALSE	FALSE
32	1	FOAM58/STD25	VENDA	755922F	898332C	24/03/2014	15:22	0	31.5	1440	27.4	41.3	TRUE		2	0	0	0	0	0	FALSE			0	1 1	1	8	9	9			FALSE	FALSE	FALSE	FALSE
33	1	FOAM47/STD22	LAVANYA	755543F	772956F	17/03/2014	21:56	0	30.2	1380	26	39	TRUE		1	0	0	0	0	0	FALSE			0	2 2	2	8	9	10			FALSE	FALSE	FALSE	FALSE
34	1	FOAM57/FORT24	PANATI SIREESHA	755838F	718211F	22/03/2014	8:33	0	30	1260	26.9	39	TRUE		1	2	3	0	0		TRUE	4.4	1.4	2	2 0	5	7	7	8			FALSE	FALSE	FALSE	FALSE
35	1	FOAM65/FORT29	SHAKILA RAJESH	758211F	089039F	01/04/2014	23:45	1	32	1420	26.7	40.7	TRUE		2	0	0	0	0	0	FALSE			0	1 1	1	8	9	9			FALSE	FALSE	FALSE	FALSE
36	1	FOAM67/FORT28	SHENBEGUM	758261F	673000D	03/04/2014	2:20	1	31.3	1480	28	40.5	TRUE		2	2	0	0	0	1	FALSE	2.9	0.9	0	2 0	1	9	10	10			FALSE	FALSE	FALSE	FALSE
37	1	FOAM60/FORT26	KRISHNAVENI	755978F	755661F	26/03/2014	1:30	1	30.2	1325	27	39	TRUE		2	0	0	0	0	1	FALSE	2.4	0.8	1	1 2	5	2	6	9			TRUE	FALSE	FALSE	FALSE
38	1	FOAM50/FORT12	SWARNLATHA GOPI	755362F	752986F	12/03/2014	14:14	0	31.5	1060	25.2	36	TRUE		2	2	0	0	0	0	FALSE			0	2 0	3	7	9	9			FALSE	FALSE	FALSE	FALSE
39	1	FOAM66/FORT32	DEEPA	758228F	002802F	02/04/2014	8:27	0	31.3	1400	26.9	39.5	TRUE		2	0	0	0	1	0	FALSE			1	1 2	5	9	10	10			FALSE	FALSE	TRUE	FALSE
40	1	FOAM69/STD30	SHAHINA	758241F	758401F	02/04/2014	13:05	0	31.5	1350	27.6	39	TRUE		1	0	0	0	0	0	FALSE			0	1 2	1	9	9	10			FALSE	FALSE	FALSE	FALSE
41	1	FOAM75/FORT33	PARIMALA	758823F	757237D	16/04/2014	12:29	0	32.3	1420	27.5	39.3	TRUE		2	1	0	0	0	0	FALSE			2	1 2	4	9	10	10			FALSE	FALSE	FALSE	FALSE
42	2	FOAM68/FORT18	HAZEERABEE	758244F	755693F	02/04/2014	16:49	1	31.5	1140	26	37	TRUE		2	2	0	0	0	0	FALSE			2	2 0	5	6	9	9	7.21	-0.5	TRUE	FALSE	TRUE	FALSE
43	1	FOAM62/STD27	RENUGA	758145F	792605F	30/03/2014	18:00	1	33.1	1280	27.5	40	TRUE		1	1	0	0	0	2	TRUE			1	2 0	5	8	9	9			FALSE	FALSE	FALSE	FALSE
44	2	FOAM51/STD14	KOMALAGUNTA	755471F	811439F	15/03/2014	18:05	1	32.3	1060	25.5	35	TRUE		2	0	2	0	0	2	TRUE			0	2 0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
45	1	FOAM80/FORT36	TAMILARASI BABY	903165F	837658F	22/04/2014	18:31	0	33	1460	27.9	40.7	TRUE		2	1	0	0	0	0	FALSE			1	2 0	5	8	9	10			FALSE	FALSE	FALSE	FALSE
46	1	FOAM74/STD35	SURYA	758711F	724481F	12/04/2014	13:07	0	31.6	1340	27.9	38.2	TRUE		1	0	0	0	0	0	FALSE			2	2 0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
47	1	FOAM46/FORT16	SHAIK SAMEENA TWIN 1	755588F	791150F	18/03/2014	19:38	1	29.3	1180	26.3	36.9	TRUE		2	2	0	0	0		TRUE	3.6	1.9	0	2 0	5	8	9	10			FALSE	FALSE	TRUE	FALSE
48	1	FOAM73/STD34	SANGYA RAJEEV TWIN1	758667F	749410F	10/04/2014	19:12	1	31	1330	27.3	37.3	TRUE		2	0	0	0	0	0	FALSE			0	2 2	1	9	9	9			FALSE	FALSE	FALSE	FALSE
49	1	FOAM85/FORT26	RATHIKA	903293F	763446F	25/04/2014	18:45	1	32.4	1200	27.3	39	TRUE		1	2	0	0	0		TRUE	6.6		1	2 0	5	8	9	9			FALSE	FALSE	FALSE	FALSE
50	1	FOAM89/STD38	BANUPRIYA	903302F	510283F	28/04/2014	23:34	0	31.5	1360	28	37.6	TRUE		1	0	0	0	0	1	FALSE	2.3		2	2 5	5	9	9	10			FALSE	FALSE	FALSE	FALSE
51	1	FOAM77/FORT22	GAYATRI BABY	758879F	260359F	17/04/2014	10:40	1	32	1140	27.3	37.8	TRUE		2	2	0	0	0	2	TRUE			0	2 0	5	4	7	10	7.18	-9.7	TRUE	FALSE	FALSE	FALSE
52	1	FOAM72/STD19	SANDHIYA TWIN2	758668F	749410F	10/04/2014	19:17	1	31	1180	27.6	37	TRUE		2	0	0	0	0	0	FALSE			0	2 2	2	9	10	10			FALSE	FALSE	FALSE	FALSE
53	1	FOAM78/STD20	GEETALAKSHMI	758882F	587861B	17/04/2014	14:43	1	31.5	960	26.6	35	TRUE		1	1	0	0	0	3	TRUE	3	1	1	2 0	5	5	8	9			FALSE	FALSE	TRUE	FALSE
54	2	FOAM82/FORT21	ADILAKSHMI	903218F	903036F	24/04/2014	3:40	1	31	1080	25.9	38	TRUE		2	0	0	0	0	0	FALSE			0	2 2	1	6	7	9			TRUE	FALSE	TRUE	FALSE
55	1	FOAM88/STD23	SURIDHA MURALI TRIPLET3	903356F	903069F	27/04/2014	22:51	0	29.4	1220	26.4	37.4	TRUE		1	2	0	0	0	0	FALSE			0	1 7	5	7	7	8			FALSE	FALSE	TRUE	FALSE
56	1	FOAM61/STD17	RADHIKA VIJAY KUMAR	758109F	755671F	29/03/2014	9:50	0	30.4	910	23.5	35	TRUE		1	2	0	0	0	2	TRUE			0	1 0	5	3	7	10			TRUE	FALSE	TRUE	FALSE
57	1	FOAM48/STD15	SHAIK SAMMEENA TWIN2	755589F	791150F	18/03/2014	21:39	1	29.3	700	22.5	32.8	TRUE		2	1	0	0	0	2	TRUE	2.5	0.8	0	2 0	5	7	9	9			FALSE	FALSE	FALSE	FALSE
58	1	FOAM95/FORT40	ANGEL JAMES	903965F	836681C	12/05/2014	11:56	0	33.1	1300	27.5	40.3	TRUE		1	0	0	0	0		TRUE	4.4	1.3	2	2 0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
59	1	FOAM94/FORT39	SULOCHNA BABY	903957F	903761F	12/05/2014	2:43	0	31.4	1300	28	39.3	FALSE		1	0	0	0	0	0	FALSE			0	1 1	3	7	8	9			FALSE	FALSE	FALSE	FALSE
60	2	FOAM86/STD25	SURIDHA MURALI TRIPLET 1	903352F	903069F	27/04/2014	22:49	0	29.4	1080	25.1	36.6	TRUE		1	2	0	0	0	0	FALSE			0	1 7	5	7	7	8			FALSE	FALSE	TRUE	FALSE
61	1	FOAM103/FORT42	KALPANA	906753F	906377F	29/05/2014	11:59	1	33.5	1460	28	40	TRUE		2	2	0	0	0		TRUE	3.1	1.1	2	2 0	5	8	8	9			FALSE	FALSE	FALSE	FALSE
62	1	FOAM87/FORT24	SUEKHA TRIPLET 2	903353F	903069F	27/04/2014	22:50	0	29.4	980	24.5	34.5	TRUE		1	2	0	0	0	0	FALSE			0	1 7	5	7	7	8			FALSE	FALSE	TRUE	FALSE

63	1	FOAM93/FORT27	AMUDHAVALLI BABY	903822F	349664F	07/05/2014	15:41	1	28.3	1220	26.7	38	TRUE		2	0	0	0	1	0	FALSE			1	0	0	5	6	8	9			TRUE	FALSE	TRUE	FALSE
64	1	FOAM92/STD29	SARANYA VASU	903851F	810511F	08/05/2014	10:59	1	30.1	1200	26.2	38.7	TRUE		1	2	0	0	0	2	TRUE	4	1.5	1	2	0	5	7	9	10			FALSE	FALSE	TRUE	FALSE
65	1	FOAM104/STD43	MOHANASUNDARI	906821F	761452F	30/05/2014	17:40	0	33.4	1380	28.4	38.5	TRUE		1	2	0	0	0	1	FALSE	2	0.7	1	1	2	4	9	10	10			FALSE	FALSE	TRUE	FALSE
66	1	FOAM108/STD44	NAGALAKSHMI	908227F	908050F	07/06/2014	3:56	0	32.1	1490	28.5	41	TRUE		1	0	0	0	0	0	FALSE			1	1	1	1	9	10				FALSE	FALSE	FALSE	FALSE
67	1	FOAM101/STD32	RAJESHWARI	906666F	826606F	27/05/2014	3:41	0	29.5	1180	24.6	37.3	TRUE		2	2	0	0	0	1	FALSE	2.7	0.9	1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
68	1	FOAM107/STD45	LALITHA BABY	908288F	908059F	08/06/2014	21:36	0	32	1300	26.3	39.3	TRUE		1	0	0	0	2	0	FALSE			2	2	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
69	1	FOAM115/FORT47	BARNEESHWARI	908911F	908082F	21/06/2014	8:57	0	32.5	1280	26.2	38.4	TRUE		2	0	0	0	2		FALSE			0	2	1	4	8	9	9			FALSE	FALSE	FALSE	FALSE
70	1	FOAM118/STD49	BHARATI	911061F	888688F	25/06/2014	9:46	0	33.5	1280	27.4	38.3	TRUE		2	2	0	0	0	1	FALSE	2.5	0.9	1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
71	1	FOAM124/STD52	LAVANYA	911214F	908795F	28/06/2014	19:48	0	33	1370	26.8	39.8	TRUE		2	2	0	0	0		TRUE	3.6	1	0	2	0	1	9	10	10			FALSE	FALSE	TRUE	FALSE
72	1	FOAM100/STD30	RADHA VIJAY	906582F	906340F	24/05/2014	17:59	1	30.6	1240	26.3	38.2	TRUE		1	3	0	0	0	0	FALSE			0	1	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
73	1	FOAM 116/FORT50	PARVEEN BABY	908972F	908759F	23/06/2014	12:29	0	32.1	1390	26.5	39	TRUE		1	0	0	0	0	0	FALSE			1	1	2	4	9	9	10			FALSE	FALSE	FALSE	FALSE
74	1	FOAM117/STD48	BABY SARALA SURESH	911009F	426960D	24/06/2014	11:24	1	33	1460	27.3	39.3	TRUE		2	1	0	0	0		TRUE	4.7	1.4	1	2	0	5	8	9	10			FALSE	FALSE	FALSE	FALSE
75	1	FOAM110/FORT46	RUHINAAZ MUBARAK	908353F	832292C	10/06/2014	11:17	0	31.1	1260	26.8	38	TRUE		2	1	1	0	0	1	FALSE	2.7	1	1	2	0	5	9	10	10			FALSE	FALSE	TRUE	FALSE
76	1	FOAM123/STD55	REKHA TIRUPATI	911246F	908800F	29/06/2014	20:49	0	32.4	1440	27.7	40	TRUE		1	2	0	0	0	0	FALSE			1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
77	1	FOAM130/FORT53	MANJULA TWIN1	911521F	897008F	04/07/2014	11:56	1	30.1	1320	27.3	37.4	TRUE		1	0	1	0	0		TRUE	3	1.1	2	2	0	5	7	7	9			FALSE	FALSE	FALSE	FALSE
78	1	FOAM120/FORT40	MAKIRA BABY	911153F	908781F	27/06/2014	9:09	1	30.6	1240	26	38	TRUE		1	2	0	0	0	0	FALSE			2	2	0	5	7	8	8			FALSE	FALSE	FALSE	FALSE
79	1	FOAM129/FORT51	SUMATHI RAJA	911362F	911421F	02/07/2014	21:43	1	31	1330	26.5	37	TRUE		1	0	0	0	0	0	FALSE			0	1	2	1	8	9	9			FALSE	FALSE	FALSE	FALSE
80	1	FOAM105/STD34	MEENAKSHI	908197F	834721F	06/06/2014	11:10	1	31.2	980	26.5	36.4	TRUE		1	2	0	0	0	2	TRUE			0	1	0	5	8	9	10			FALSE	FALSE	TRUE	TRUE
81	2	FOAM102/FORT31	KUMUDHA	906765F	771180F	29/05/2014	11:57	0	29	1110	25.8	36.5	TRUE		2	0	0	0	0	0	FALSE			0	1	2	1	7	7	8			FALSE	FALSE	FALSE	FALSE
82	1	FOAM125/FORT54	MAGESHWARI BABY	911296F	911408F	01/07/2014	9:54	0	32.3	1300	27.9	39.5	TRUE		1	3	0	0	0	0	FALSE			1	2	0	5	3	6	8	7.29	-2.3	TRUE	FALSE	FALSE	FALSE
83	2	FOAM140/STD39	MANJULA TWIN2	911522F	897008F	04/07/2014	11:57	1	30.1	1180	26.8	38.5	TRUE		1	0	1	0	0	2	TRUE			0	2	0	5	7	7	9			TRUE	FALSE	FALSE	FALSE
84	1	FOAM111/STD37	KANIMOZHI	908463F	908098F	13/06/2014	2:13	0	28.3	980	25.6	35.9	TRUE		1	3	0	0	0	0	FALSE			2	0	0	5	4	6	8	7.25	-5.3	TRUE	FALSE	TRUE	FALSE
85	1	FOAM114/FORT35	MALA TWIN2	908905F	852446F	21/06/2014	17:54	1	30.1	1100	24.5	36.1	TRUE		2	0	0	0	0	0	FALSE			1	1	1	4	9	9	9			FALSE	FALSE	FALSE	FALSE
86	1	FOAM106/FORT33	GOMATHI	908194F	783063F	06/06/2014	14:20	0	30.6	720	24.7	32	TRUE		2	2	0	0	0	2	TRUE			0	2	0	5	6	7	10			TRUE	FALSE	FALSE	FALSE
88	1	FOAM132/STD56	GAYATHRI	911705F	464947D	09/07/2014	3:04	1	28.3	1260	26.5	37	TRUE		2	0	0	0	0	0	FALSE			1	1	1	1	7	9	10			FALSE	FALSE	TRUE	FALSE
89	1	FOAM136/FORT58	LATHA TWIN 1	911999F	904038F	16/07/2014	11:50	1	31	1420	29.1	39	TRUE		1	1	1	0	0	0	FALSE			0	2	3	5	9	10	10			FALSE	FALSE	TRUE	FALSE
90	1	FOAM139/FORT60	SANTOSHI	913334F	892754F	23/07/2014	18:37	1	32.6	1380	28.4	41.1	TRUE		1	0	0	0	0	0	FALSE			1	2	1	1	9	9	9			FALSE	FALSE	FALSE	FALSE
91	1	FOAM135/STD57	KALAIRANI	911920F	323543F	14/07/2014	14:04	0	32.6	1300	26.8	39.7	TRUE		2	0	0	0	0		TRUE	4.2	1.4	2	2	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
92	1	FOAM113/FORT38	MALA TWIN1	908904F	852446F	21/06/2014	17:26	1	30.1	965	23.4	34.5	TRUE		2	0	0	0	0	0	FALSE			1	1	1	3	5	7	7			TRUE	FALSE	TRUE	FALSE
93	2	FOAM112/STD36	TASNEEM	908854F	910384F	20/06/2014	15:12	1	30.5	1060	26.4	36.3	TRUE		2	2	0	0	0		TRUE	4.1	1.2	0	2	0	5	6	7	9			TRUE	FALSE	FALSE	FALSE
94	1	FOAM148/STD63	SUMATHI	913715F	795904D	01/08/2014	15:39	0	32.6	1350	27.8	39.8	TRUE		2	2	0	0	0	1	FALSE	2	0.9	1	2	0	1	9	9	10			FALSE	FALSE	FALSE	FALSE
95	1	FOAM142/STD62	SRARALA TRIPLET III	913426F	888685F	25/07/2014	18:53	1	33	1460	27.8	41	TRUE		2	0	0	0	0	0	FALSE			0	1	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
96	1	FOAM138/STD61	RENUKA	913220F	789636F	19/07/2014	17:42	1	31.5	1480	26.6	40.5	TRUE		1	0	0	0	0		TRUE	3.4	1.2	2	2	0	5	5	8	10			TRUE	FALSE	FALSE	FALSE
97	1	FOAM134/STD44	LAXMI	911787F	000845F	10/07/2014	21:27	0	33.5	1020	26.6	36.3	TRUE		2	1	0	0	0		TRUE	6.9	1.6	1	2	0	5	3	6	7			TRUE	FALSE	FALSE	FALSE
98	1	FOAM131/FORT42	MALARVANI TWIN2	911609F	911447F	07/07/2014	17:32	1	33.1	965	26	36	TRUE		1	2	0	0	0	0	FALSE			0	1	2	5	8	9	10			FALSE	FALSE	TRUE	TRUE
100	1	FOAM137/FORT45	LATHA TWIN2	912000F	904038F	16/07/2014	11:51	1	31	980	26.8	36.5	TRUE		1	1	1	0	0	2	TRUE			0	2	6	5	5	9	10			TRUE	FALSE	FALSE	FALSE
101	1	FOAM 151/FORT48	SANTHIYA TWIN2	913756F	827140F	02/08/2014	15:04	1	30.1	1230	27	37.5	TRUE		1	0	0	0	0	0	FALSE			1	1	1	1	5	7	9			TRUE	FALSE	TRUE	FALSE
102	1	FOAM161/FORT66	PAWANA KUMARI	916173F	913926F	11/08/2014	10:25	1	33.1	1300	28	38.2	TRUE		1	2	0	0	0	0	FALSE			2	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
103	1	FOAM164/STD69	VIJAYA	916291F	913939F	14/08/2014	4:24	1	33.6	1490	29.5	41	TRUE		1	2	0	0	0	0	FALSE			0	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
104	1	FOAM153/STD67	JYOTHI	913892F	047672F	07/08/2014	1:28	0	31	1490	28	38.8	TRUE		2	0	0	0	0	1	FALSE	2.4	0.8	1	2	1	1	9	9	10			FALSE	FALSE	TRUE	FALSE
105	1	FOAM160/FORT68	DEVI	916191F	742600D	11/08/2014	18:10	1	33.3	1420	27.3	40	TRUE		2	2	0	0	0	2	TRUE			1	1	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
106	1	FOAM147/STD47	SOUMIYA BABY	913558F	875586F	29/07/2014	7:44	0	30	960	25.3	35.3	TRUE		1	2	0	0	1	0	FALSE			0	1	0	5	7	8	9	7.08	-16.4	TRUE	FALSE	FALSE	FALSE
107	2	FOAM 146/ FORT 65	RADH KALYANI BABY	913501F	673784F	27/07/2014	00:53	1	30.1	1340	26.5	39.5	TRUE		2	0	3	1	0	0	FALSE			1	1	1	1	9	10	10			FALSE	FALSE	TRUE	TRUE
108	1	FOAM 162/ STD 50	KALAIVANI	916144F	163042C	10/08/2014	14:30	1	31.2	1220	26.5	39.3	TRUE		1	2	0	0	0	1	FALSE	2.6	0.6	1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
109	1	FOAM159 FORT 53	INDHUPRIYA	916228F	954714D	12/08/2014	15:13	0	33	1220	27.5	38	TRUE		2	2	0	0	0	2	TRUE			1	1	0	5	9	9	10			FALSE	FALSE	TRUE	FALSE
110	1	FOAM169/ FORT 71	DEVI VINOD	917786F		27/08/2014	01:10	1	33.6	1340	28	40.2	TRUE		1	0	0	0	0	0	FALSE			1	3	1	1	9	9	10			FALSE	FALSE	FALSE	FALSE
111	1	FOAM 158/ STD 52	MANJULA	900309F		08/08/2014	4:30	0	33.5	1160	27.4	38.2	TRUE		1	0	0	0	0	0	FALSE			0	3	1	1						FALSE	FALSE	FALSE	FALSE
112	1	FOAM 157 STD 49	SANGEETA SARWANAN	916022F	815018F	07/08/2014	15:32	0	28	1040	23.4	37.3	TRUE		1	0	1	0	0	0	FALSE			1	1	1	1	7	7	8			FALSE	FALSE	FALSE	FALSE
113	1	FOAM 156 / FORT 54	SUDHA	916045F	913919F	08/08/2014	3:30	0	27.6	1160	25	37.2	TRUE		1	0	0	0	0	0	FALSE			0	0	1	1	9	9	10			FALSE	FALSE	FALSE	FALSE
114	2	FOAM 152 STD 51	KAVITHA	913883F	816262F	06/08/2014	18:15	1	28.3	1095	25	38	TRUE	1	2	0	0	0	0	0	FALSE			1	1	1	1	7	7	9			FALSE	FALSE	TRUE	FALSE
115	1	FOAM 180 STD 75	SUGANTHI JAGANNATH	921108F	834241F	22/09/2014	10:31	0	32.4	1490	28.2	40.2	TRUE		1	0	1	0	0	1	FALSE	2.2	0.7	1	2	1	4	5	8	10			TRUE	FALSE	FALSE	FALSE
116	1	FOAM 177 FORT 73	SHARMILA AMRITRAJ	918934F	632682D	18/09/2014	9:50	0	33.6	1380	27.2	39.6	TRUE		2	2	0	0	0		TRUE	4.5	1.4	1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
117	1	FOAM 175 STD 72	BAKIYAMMAL SELVARAJ	918592F	294919F	12/09/2014	14:04	1	33.6	1300	27.7	40.4	TRUE		2	2	0	0	0		TRUE	4	1.2	1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
118	1	FOAM 173 STD 57	SHAIK RABIYA	918413F	916768F	08/09/2014	16:22	1	29.2	1205	26.5	38.5	TRUE		2	0	0	0	0	1	FALSE	2.8	0.8	2	2	2	5	9	10	10			FALSE	FALSE	FALSE	FALSE
119	1	FOAM 163 FORT 55	SELVI RAJENDRA	916305F	150498C	14/08/2014	11:27	0	28.6	830	24.5	35.2	TRUE		2	2	0	0	0	1	FALSE	2.7	1	1	2	0	5	7	9	10			FALSE	FALSE	FALSE	TRUE
120	1	FOAM 182 STD 76	BEE BEE	921178F	918800F	23/09/2014	22:58	0	30.2	1410	28.5	39.9	FALSE		1	3	0	0	0	1	FALSE			2	2	0	1	9	10	10			FALSE	FALSE	FALSE	FALSE
121	1	FOAM 174 STD 59	JHANSI MOHAN	918475F	918705F	10/09/2014	5:30	1	30.4	1230	27.1	38	TRUE		2	2	0	0	0	0	FALSE			1	1	0	5	6	8	10			TRUE	FALSE	TRUE	TRUE
122	1	FOAM STD 56	SANGEETA JACQLIN	916941F	307850D	28/08/2014	4:55	0	28.6	865	23.3	34.5	TRUE		2	0	0	0	0	0	FALSE			1	1	1	4	7	8	10			FALSE	FALSE	TRUE	FALSE
123	1	FOAM 181 STD 74	SHANTHI	921177F	918788F	24/09/2014	00:00	0	32.3	1360	28	40	TRUE		1	2	0	0	0	0	FALSE			1	2	1	4	8	8	10			FALSE	FALSE	FALSE	FALSE
124	1	FOAM 191 STD 78	HEMALATHA	921677F	921449F	03/10/2014	20:50	0	31.6	1490	27	41	TRUE		1	0	0	0	0	0	FALSE			1	2	2	1	9	9	10			FALSE	FALSE	FALSE	FALSE
125	1	FOAM 188 FORT 79	MALLESWARI	921581F	396105D	01/10/2014	2:59	1	32.3	1340	27.6	40.1	TRUE		2	2	0	0	0		TRUE	3.1	1	0	2	0	1	9	10	10			FALSE	FALSE	FALSE	FALSE

126	1	FOAM 189 FORT 80	REVATHI IYAPPAN	921574F	921447F	30/09/2014 21:57	0	31	1440	27.9	39.8	TRUE	2	0	0	0	1	0	FALSE			1	1	0	5	5	8	10			TRUE	FALSE	TRUE	FALSE
127	1	FOAM 192 STD 82	SUMALATHA PRABHAKAR	921775F	666911C	06/10/2014 10:22	1	33.2	1260	27	37.2	TRUE	2	0	0	0	0	1	FALSE	2.3	0.6	1	1	2	4	7	9	10			FALSE	FALSE	FALSE	FALSE
128	2	FOAM 187 / FORT 77	JALAGAM MANIKUMARI	921507F	922479F	27/09/2014 16:50	1	31	1360	25.8	39.1	TRUE	2	0	0	0	0	0	FALSE			0	2	2	5	7	8	10			TRUE	FALSE	FALSE	TRUE
129	1	FOAM 190 STD 61	SUGANYA RAJENDRAN	921638F	921463F	02/10/2014 19:45	1	31.2	1130	26	38.7	TRUE	1	0	0	0	0	0	FALSE			0	0	1	1	7	10	10			TRUE	FALSE	FALSE	FALSE
130	1	FOAM 197 STD 84	VIJAYLAKSHMI	924041F	064417C	10/10/2014 18:26	0	32.2	1360	27.5	39.6	TRUE	2	0	0	0	0		TRUE	3.4	1.1	1	2	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
131	2	FOAM 172 FORT 58	GEETA VENKATRAMAN	918267F	160608F	05/09/2014 00:06	0	29.3	880	23.1	35.7	TRUE	2	1	3	1	0		TRUE	9.5	1.4	1	2	0	5	9	9	10			FALSE	FALSE	TRUE	TRUE
132	1	FOAM 195 FORT 62	KUMUTHA LAKSHMI	921885F	862418F	09/10/2014 10:11	0	28.6	1090	25.8	37.2	TRUE	1	2	0	0	1	0	FALSE			1	2	0	5	9	9	9			FALSE	FALSE	TRUE	TRUE
133	1	FOAM 199 FORT 85	KAUSAR	924567F	067684F	22/10/2014 9:34	0	32.4	1260	27.6	38	TRUE	2	2	0	0	0		TRUE	4.6	1.4	0	2	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
134	1	FOAM 189 FORT 60	ARUNA KARTHIGAYAN	921398F	896489F	29/09/2014 2:45	1	30.1	1020	25	35	TRUE	1	1	0	0	0		TRUE	4.5	1.4	0	0	1	3	6	8	10			FALSE	FALSE	FALSE	FALSE
135	2	FOAM 202 FORT 65	PUNITHA GOPI	924931F	031900C	28/10/2014 11:48	1	31.3	1160	28.6	36.8	TRUE	1	0	0	0	0		TRUE	5.6	1.5	1	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
136	1	FOAM 201 STD 63	SAMUNDESHWARI	924622F	921990F	23/10/2014 3:44	1	32.3	1080	26.1	35.5	TRUE	2	1	0	0	1	0	FALSE			0	1	0	5	9	9	10			FALSE	FALSE	TRUE	TRUE
137	1	FOAM 203 FORT 86	VIDHYA KARTHIKAYEN	927171F	059594D	02/11/2014 18:46	1	30.5	1325	27.4	39.5	TRUE	2	2	0	0	0	0	FALSE			1	2	0	5	6	9	10	7.19	-7.9	TRUE	FALSE	TRUE	FALSE
138	2	FOAM 214 STD 87	NAVEENA	927878F	015707G	16/11/2014 2:50	1	32.3	1480	28	40	TRUE	1	0	0	0	0		FALSE	2.2	0.8	1	2	0	5	9	10	10			FALSE	FALSE	TRUE	FALSE
139	1	FOAM 207 FORT 66	UMAS	925132F		08/11/2014 18:51	1	32	1120	26.2	37.5	TRUE	2	0	0	0	0	0	FALSE			0	2	2	1						FALSE	FALSE	FALSE	FALSE
140	1	FOAM 217 FORT 88	SUJATHA GOLDWIN	930143F	127377B	21/11/2014 21:22	1	30.1	1320	26.5	39	TRUE	2	2	0	0	0		FALSE	2.6	0.8	0	1	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
141	1	FOAM 212 FORT 68	GAYATHRI II	927674F	892277F	11/11/2014 18:55	0	32.1	1205	28.3	38.2	TRUE	1	2	1	0	1	0	FALSE			0	2	2	5	4	7	10			TRUE	FALSE	FALSE	FALSE
142	2	FOAM 198 STD 64	KALAIVANI	924353F	073241G	17/10/2014 10:30	1	28.3	940	24.7	34.5	TRUE	1	0	0	0	0	0	FALSE			1	2	1	1	6	9	10			TRUE	FALSE	FALSE	FALSE
143	1	FOAM 222 STD 91	GAYATHRI GAJENDRAN	930662F	930512F	30/11/2014 16:04	1	33.6	1390	28.9	39.5	TRUE	1	0	0	0	0	2	TRUE	3	1.2	2	2	0	1	9	10	10			FALSE	FALSE	FALSE	TRUE
144	1	FOAM 221 STD 89	MADHURI	930652F	085421G	30/11/2014 10:00	1	33.1	1420	28.4	40.4	TRUE	1	1	0	0	0		FALSE	2.6	0.9	0	2	0	1	9	10	10			FALSE	FALSE	FALSE	FALSE
145	1	FOAM 215 STD 69	PRIYA RAJA	927877F	867481F	15/11/2014 18:19	0	30.2	1205	26	38.3	TRUE	2	2	0	0	0	0	FALSE			0	1	0	5	5	9	10	7.13	-11.3	TRUE	FALSE	FALSE	TRUE
146	1	FOAM 208 STD 67	APSANA	927547F	927405F	08/11/2014 14:33	0	30.6	1070	25.8	36.2	TRUE	1	1	0	0	0	0	FALSE			0	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
147	1	FOAM 220 FORT 90	UMA MAHESWARI	930628F	104653G	29/11/2014 16:43	0	33	1320	28.1	39	TRUE	2	0	0	0	0		TRUE	3.1		2	2	0	5	9	10	10			FALSE	FALSE	FALSE	FALSE
148	1	FOAM224 FORT 93	VANITHA	930864F	930538F	04/12/2014 22:35	1	31.4	1330	27	39	TRUE	1	2	0	0	0	0	FALSE			2	1	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
149	1	foam 216 std 70	Anitha Bharath	930134F	054693F	21/11/2014 14:18	0	31.4	1120	25.4	37.3	TRUE	1	2	0	0	1		FALSE	2.7	0.9	1	2	0	5	3	8	9	6.79	-16.7	TRUE	FALSE	TRUE	FALSE
150	1	FOAM 223/ FORT 92	SAMUNDESHWARI	930721F	930516F	02/12/2014 7:05	1	31.2	1280	26.8	38	TRUE	2	0	3	0	0		FALSE	2.1	0.7	2	2	2	5	9	9	10			FALSE	FALSE	FALSE	FALSE
151	1	FOAM 218 FORT 71	KALPANA	930372F	927482F	26/11/2014 15:33	0	31.6	960	26.7	35.5	TRUE	2	2	0	0	0		TRUE	4.2	1.4	1	2	0	5	9	9	10			FALSE	FALSE	FALSE	FALSE
152	1	FOAM 227 FORT 72	KANAGI	930812F	208704F	03/12/2014 21:07	0	32.5	1090	25.8	37	TRUE	2	0	0	0	0		TRUE	3.7	1.2	2	2	0	1	8	9	10			FALSE	FALSE	FALSE	FALSE

prenalk	postnalk	convl	ttn	hmd	nsup	pda	pdadrug	apnea	alrik	prenec	postnec	prefeedi	postfee	prewepsk	presepsorg	prenveli	postsepsk	postsepsorg	posmenin	cld	mbd	ivh	pvl	rop	ropstage	prerbc	postrbc	cl	uvc	uac	plcc	predys	postdys	prelna	postlna
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	142	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE					TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0				FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	130	
TRUE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		1	1	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	125	139
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	135
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE			2		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	125	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	125	134
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	2		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	133
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	1	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	127	131
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE			2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	140	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	TRUE	3	KLEBSIELLA	FALSE	3	TRUE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	141	132
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	TRUE	0		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	136
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	2		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0				TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	144	
FALSE	FALSE	FALSE	FALSE	TRUE	7	FALSE		FALSE	TRUE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	136	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		TRUE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	138	134
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE		
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE		
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE		
FALSE	TRUE	FALSE	FALSE	TRUE	1	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	3	CONS	FALSE	2	FALSE	FALSE	2	TRUE	2	FALSE	1	1			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	131
FALSE	TRUE	FALSE	FALSE	TRUE	7	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	1	FALSE	FALSE	1	FALSE	0	FALSE	1	1			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	136	120
FALSE	FALSE	FALSE	FALSE	TRUE	7	FALSE		TRUE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	1	FALSE	1	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	132	121
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2		TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	129	
FALSE	TRUE	FALSE	FALSE	TRUE	7	FALSE		TRUE	FALSE	0	0	FALSE	FALSE	1		FALSE	1	FALSE	FALSE	2	FALSE	0	FALSE	0		2		TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	140	130
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	1	FALSE	FALSE	1	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE					TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	136	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	TRUE	0	TRUE			2		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	1	FALSE	1	1	1		TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	138	129
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	145	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	140	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	138	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	3	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0		2		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	140	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	3	TRUE	FALSE	0	FALSE	2	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	140	131
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	131	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	3	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	142	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	2		FALSE	1	FALSE	FALSE	0	FALSE	1	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	FALSE	FALSE	0	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0		2		TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	133	
FALSE	FALSE	FALSE	FALSE	TRUE	7	TRUE	1	FALSE	TRUE	0	0	TRUE	FALSE	1		FALSE	2	FALSE	TRUE	0	FALSE	3	TRUE	0		2		TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	130	133
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	130	
FALSE	FALSE	FALSE	FALSE	TRUE	7	FALSE		FALSE	TRUE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	132	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	141	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	TRUE	1		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	123	130
FALSE	FALSE	FALSE	FALSE	TRUE	6	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2		TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	141	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	TRUE	0	FALSE	0		2		TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	2	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	142	131
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	1	2	2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	3	FALSE	0		3		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	142	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2		TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	115	130
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	TRUE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	1	FALSE	1	FALSE	1	2	2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	138
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	5	FALSE	0		1		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	1	FALSE	0	FALSE	0		2		TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	140	

FALSE	TRUE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	1	FALSE	FALSE	1	FALSE	2	FALSE	0			TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	141	122
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	3	FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	108	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	128	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	143	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		TRUE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	138	135
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	2	FALSE	FALSE	0	0	TRUE	FALSE	2		TRUE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		TRUE	FALSE	0	0	TRUE	FALSE	3	CONS	FALSE	2	FALSE	FALSE	1	TRUE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	144	133
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE			2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE				FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	148	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	TRUE	3	CONS	FALSE	2	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	135	132
FALSE	FALSE	FALSE	FALSE	FALSE	0	TRUE	1	FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	120	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	138	
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	2	FALSE	FALSE	0	0	TRUE	FALSE	2		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	138	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	TRUE	FALSE	7	TRUE		FALSE	FALSE	0	0	TRUE	FALSE	2		TRUE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	125	134
FALSE	FALSE	FALSE	FALSE	FALSE	0	TRUE	1	FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	142	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	136	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	1	1	2	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	132	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	137	138
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	128	
FALSE	FALSE	FALSE	FALSE	TRUE	7	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	2		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	129	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE				TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	TRUE	FALSE	1	TRUE	8	FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	2	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	144
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	141	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		TRUE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	140	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	TRUE	3	CONS	TRUE	1	FALSE	TRUE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	145	137
FALSE	FALSE	FALSE	FALSE	TRUE	7	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	137
FALSE	TRUE	FALSE	TRUE	FALSE	1	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	1	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	125	116
FALSE	FALSE	FALSE	FALSE	FALSE	0	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	2		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	136	139
FALSE	FALSE	FALSE	FALSE	TRUE	6	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	144	134
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		1	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	131	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	FALSE	TRUE	7	TRUE	6	FALSE	FALSE	0	0	TRUE	FALSE	2		TRUE	1	FALSE	FALSE	0	FALSE	2	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	123	135
FALSE	FALSE	FALSE	FALSE	TRUE	1	TRUE	2	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	TRUE	0		3	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	150	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	145	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	2	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	143	141
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		TRUE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	133	147
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	1	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	148	141
FALSE	FALSE	FALSE	TRUE	FALSE	1	TRUE	1	FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	132	131
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	131	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	130	
FALSE	FALSE	TRUE	FALSE	TRUE	6	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	136	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	3	CONS	FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	3	CONS	FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	1	1	2	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	126	139
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	3	FALSE				FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	131	
FALSE	FALSE	FALSE	FALSE	TRUE	7	TRUE	1	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	135
FALSE	FALSE	FALSE	FALSE	TRUE	7	TRUE	1	TRUE	TRUE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	1	FALSE	1	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	119	130
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0		3	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE		FALSE	FALSE	0	0	TRUE	FALSE	3	NFGN0	FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	123	

FALSE	FALSE	FALSE	FALSE	TRUE	4	FALSE	FALSE	TRUE	0	0	FALSE	FALSE	2		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	124	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	125	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	TRUE	1		FALSE	1	FALSE	FALSE	0	FALSE	0	FALSE	0		2	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	142	132
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	140	
FALSE	TRUE	FALSE	FALSE	TRUE	7	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	145	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	3	TRUE	FALSE	0	FALSE	2	TRUE	0		2	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	129	133
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	129	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	TRUE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	131	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	136	131
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	135	
FALSE	FALSE	FALSE	FALSE	TRUE	1	FALSE	TRUE	FALSE	0	0	FALSE	FALSE	3	CONS	FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	132	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	1	TRUE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	FALSE	TRUE	6	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	146	
FALSE	TRUE	FALSE	FALSE	TRUE	1	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	1	FALSE	FALSE	0	FALSE	1	FALSE			2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	137
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	133	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	1	FALSE	FALSE	0	FALSE	2	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	127	131
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	TRUE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		2	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	131	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	140	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	TRUE	1	1	2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	133	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0			TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	134	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	138	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	TRUE	FALSE	0	0	TRUE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	137	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	0		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	129	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	3	E COLI	FALSE	0	FALSE	FALSE	0	FALSE	1	FALSE	0		1	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	132	
FALSE	FALSE	FALSE	TRUE	FALSE	1	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	139	
FALSE	FALSE	FALSE	FALSE	FALSE	0	FALSE	FALSE	FALSE	0	0	FALSE	FALSE	1		FALSE	0	FALSE	FALSE	0	FALSE	0	FALSE	0		2	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	129	